In the '50s, it was big fins…

In the '60s, it was big engines…

In the '70s it was big fuel economy…

In the '80s it was big interiors…

In the '90s it was just big…

Is the new wave in America big technology?

Dust to Dust

The Energy Cost of New Vehicles

From Concept to Disposal

The non-technical report

From CNW Marketing Research, Inc.

Contents

TOTAL REPORT: 458 Pages in Microsoft Word

INTRODUCTION

In February, 2001 CNW Research staff in one of its regular brainstorming sessions hit on the notion of looking at total energy needed in the auto industry on a worldwide basis. That is, what was the real energy cost – from Dust to Dust – of producing vehicles for consumer use?

Over time and after on and off again discussions, as well as extensive Internet searches of available studies on this issue, it was discovered that many had tried, none had succeeded in measuring TOTAL energy consumption for the auto industry.

In many cases the jargon was overly technical and aimed at scientists and engineers. In other cases, the analysis was incomplete not taking into account the energy cost of simply conceiving of a new automotive idea or "off loading" manufacturing energy requirements to suppliers. In the latter case, for example, by requiring parts suppliers to perform sub-assemblies and "modules" that go into the production of a vehicle, it removes that energy usage from the assembly plant to the supplier production line. In some cases, Toyota being one, it allows the manufacturer to claim a significant reduction in plant energy usage and an improvement in efficiency while, in reality, the energy costs have simply been moved from one site to another.

By the end of 2001 and into 2002, it was clear that there was a need for such research that could be explained to the public in a way that would add to the general population's knowledge about the energy cost of the vehicles they drive.

The problem remained, however, how to do it in such a way that avoided the jargon.

By the end of 2002, CNW decided to at least attempt to put numbers to the question based on whatever public and private records could be gathered. We took the "white board" approach. That is, we began listing the pieces of the energy puzzle that needed to be uncovered and/or collected and/or uniquely researched that would be necessary for a solid analysis.

Over the course of 2003, the White Board became crowded with every conceivable energy-required action necessary to conceive, produce, drive, and dispose of a vehicle. In all, nearly 4,000 data points were considered pertinent.

In December 2003 it was decided to go ahead with the research and begin the collection process of what was available through the Society of Automotive Engineers papers, manufacturer and supplier public records, previous research and other data sources.

By late 2004 it was clear that more than half of the data could be publicly obtained with little additional research on CNW's part, but the remaining half needed a commitment of time and funds. In addition, it was clear that most of the historical information needed to be updated, in some cases significantly, to be of use.

With extensive journalistic experience as a reporter and editor for such publications as *Ward's Automotive Reports, Ward's Engine Update (nee Ward's Wankel Report), Ward's Auto World, Automotive Age* and other automotive trade publications, compiling lists of possible sources and historical data as well as current information on plants and vehicles produced at each was easily obtained.

By mid-2005, many of the gaps were being filled and a series of on-site analysis of manufacturing plants was clearly needed. This included, for example, the distances workers traveled to assembly plants; the use of mass transit and/or private vehicles; the types of vehicles driven; distances from home to plant. This had to be done on site and with phone and mail surveys in native languages and with sufficient responses to be useful.

One key ingredient: Not to let automakers, suppliers or any other outside organization know the research was underway. Nor accepting outside assistance in the funding of the project. The goal was to avoid, regardless of the end result, being labeled a “supporter of…” those who produce hybrid vehicles or the auto industry or the oil industry or the LPG industry or any other group, organization or partisan cause. In some cases, this meant hiding energy-related questions behind or within other inquiries.

While it may be considered a misrepresentation, the approach worked. We were able to gain insights and data that otherwise would have been blocked for this research. For those who provided the data through this method – we apologize and will not release either the names of the individuals or the companies from which this information was obtained.

The second half of 2005 required extensive time to begin formulating the information into a “by model” matrix and data base. While much had already been done, it was clear that there was much to go. And the decision had yet been made about the method of reporting the findings that could be used by average consumers rather than just technicians, engineers and scientists.

Clearly the information needed to be put into the most common and understandable rating. “Cents per mile” was the most logical choice. Technically it would be less stable because energy costs change in short bursts but energy requirements don’t. So it would require a number of assumptions and projections to be built into the data sets.

The following data will provide those assumptions, but generally we took a worse case scenario of $80 per barrel of oil and gasoline prices of $3.00 (sustained) per gallon as general conditions for the most volatile of the energy sources.

Then we translated all of the non-U.S. data and prices to U.S. dollars (2005).

For future or projected costs, we elected to use 2005 Dollars as well as assuming those interested in the data as well as CNW could adjust for inflation or deflation, as needed.

By November 2005 all of the data points were filled and the next three months were spent adjusting and updating those pieces of information that had changed including the models of vehicles sold, changes in content, etc.

This was done for all 311 vehicle models measured, some 2005 models, some as early as 2002 models which were our initial test vehicles to see how the data base would be able to handle year-to-year changes and a few new models.

The first announcement of the findings provided a brief overview of the study and the list of vehicles with their "cents per mile" figure. Let's look at the original information release:

Hybrids Consume More Energy in Lifetime Than Chevrolet's Tahoe SUV

BANDON, OR -- As Americans become increasingly interested in fuel economy and global warming, they are beginning to make choices about the vehicles they drive based on fuel economy and to a lesser degree emissions.

But many of those choices aren't actually the best in terms of vehicle lifetime energy usage and the cost to society over the full lifetime of a car or truck.

CNW Marketing Research Inc. spent two years collecting data on the energy necessary to plan, build, sell, drive and dispose of a vehicle from initial concept to scrappage. This includes such minutia as plant to dealer fuel costs, employee driving distances, electricity usage per pound of material used in each vehicle and literally hundreds of other variables.

To put the data into understandable terms for consumers, it was translated into a "dollars per lifetime mile" figure. That is, the Energy Cost per mile driven.

The most Energy Expensive vehicle sold in the U.S. in calendar year 2005: Maybach at $11.58 per mile. The least expensive: Scion xB at $0.48 cents.

While neither of those figures is surprising, it is interesting that driving a hybrid vehicle costs more in terms of overall energy consumed than comparable non-hybrid vehicles.

For example, the Honda Accord Hybrid has an Energy Cost per Mile of $3.29 while the conventional Honda Accord is $2.18. Put simply, over the "Dust to Dust" lifetime of the Accord Hybrid, it will require about 50 percent more energy than the non-hybrid version.

One of the reasons hybrids cost more than non-hybrids is the manufacture, replacement and disposal of such items as batteries, electric motors (in addition to the conventional engine), lighter weight materials and complexity of the power package.

And while many consumers and environmentalists have targeted sport utility vehicles because of their lower fuel economy and/or perceived inefficiency as a means of transportation, the energy cost per mile shows at least some of that disdain is misplaced.

For example, while the industry average of all vehicles sold in the U.S. in 2005 was $2.28 cents per mile, the Hummer H3 (among most SUVs) was only $1.949 cents per mile. That figure is also lower than all currently offered hybrids and Honda Civic at $2.42 per mile.

"If a consumer is concerned about fuel economy because of family budgets or depleting oil supplies, it is perfectly logical to consider buying high-fuel-economy vehicles," says Art Spinella, president of CNW Marketing Research, Inc. "But if the concern is the broader issues such as environmental impact of energy usage, some high-mileage vehicles actually cost society more than conventional or even larger models over their lifetime.

"We believe this kind of data is important in a consumer's selection of transportation," says Spinella. "Basing purchase decisions solely on fuel economy or vehicle size does not get to the heart of the energy usage issue."

The goal of overall worldwide energy conservation and the cost to society in general – not just the auto buyer – can often be better addressed by being aware of a car or truck's "dust to dust" energy requirements, he said.

This study is not the end of the energy-usage discussion. "We hope to see a dialog begin that puts educated and aware consumers into energy policy decisions," Spinella said. "We undertook this research to see if perceptions (about energy efficiency) were true in the real world."

The second release added some break downs in the overall research.

Energy Efficiency is More than Just Fuel Economy

Looking for an energy efficient vehicle? Scion xB leads the list, significantly better than even the best hybrids.

That's the conclusion of long-term study of "dust to dust" energy costs for cars and trucks. The research tracked and calculated the energy cost of each model sold in the U.S. in 2005 from initial concept to the projected time it is scrapped.

The Top 10 most energy efficient vehicles over their lifetime:

1. Scion xB ($0.48 per mile)
2. Ford Escort (0.57 per mile)
3. Jeep Wrangler ($0.60 per mile)
4. Chevrolet Tracker ($0.69 per mile)
5. Toyota Echo ($0.70 per mile)
6. Saturn Ion ($0.71 per mile)
7. Hyundai Elantra ($0.72 per mile)
8. Dodge Neon ($0.73 per mile)
9. Toyota Corolla ($0.73 per mile)
10. Scion xA ($0.74 per mile)

The 10 least energy efficient vehicles over their lifetime:

1. Mercedes Benz produced Maybach ($11.58 per mile)
2. Volkswagen Phaeton ($11.21 per mile)
3. Rolls-Royce (full line average: $10.66 per mile)
4. Bentley (full line average: $10.56 per mile)
5. Audi allroad Quattro ($5.59 per mile)
6. Audi A8 ($4.96 per mile)
7. Audi A6 ($4.96 per mile)
8. Lexus LS430 ($4.73 per mile)
9. Porsche Carrera GT ($4.53 per mile)
10. Acura NSX ($4.45 per mile)

Hybrid energy efficiency over their lifetime:

1. Honda Insight ($2.94 per mile)
2. Ford Escape Hybrid ($3.18 per mile)
3. Honda Civic Hybrid ($3.24 per mile)
4. Toyota Prius ($3.25 per mile)
5. Honda Accord Hybrid ($3.30 per mile)

The study measures all energy needed for vehicles sold in the U.S. in cy2005. The data applies to new and used vehicles even though most calculations were made on cy05 models.

Data includes supplier as well as brand manufacturer energy consumption for the listed vehicles; transportation at all levels of distribution; use of materials (plastics, steel, light-weight steel, aluminum, etc.) and literally hundreds of other factors.

While historical data is spotty, CNW analysis shows the industry as a whole has improved manufacturing energy efficiency significantly in the production portion of the calculation – between 15 and 20 percent – since 1995. This, however, is only a small part of the total Energy Cost per Mile calculation.

The full list of vehicles will be dissected later in this report, but needless to say the first two releases were received with some extreme reactions, both positive and negative. We've provided samples of those emails and letters in the **Q&A Section** of this report.

Some of the Q&A entries include references to other studies.

We've also added a number of reports, press stories and other related information in the **Appendices Section.**

While initially we intended to charge a fee for the initial data and report, the intense consumer interest altered those plans. We now intend to release the information at no charge to the public with CNW subscribers receiving a two-week advance on any and all data that comes from this research.

WHERE TO NOW?

With the data base and methodology set, we believe we can provide this information on an annual basis if the demand seems appropriate. In many cases, as with the Lexus RX400h, we will add the data as the vehicles are introduced and the information becomes available to us.

HOW IMPORTANT IS THIS RESEARCH?

The United States and other parts of the world have been bombarded with news stories about global warming and the impact of human behavior on that condition. Simultaneously, there have been parallel stories about oil dependence and the impact Sport Utility Vehicles (for example) are having on the reliance on that commodity.

Some have begun promoting hybrid passenger cars and trucks as a means of reducing both of these conditions. Government agencies are offering significant incentives for consumers to buy hybrids as are manufacturers. Is this misguided? Perhaps. We make no conclusion about such good intentions. **Our goal, again, is simply to look at what society has to pay for the energy needed to support various vehicles.**

The true issue is one of energy expenditures not just oil consumption. While we could add data related to emissions, the point was and is to keep it all very simple and concentrate on the broader issue of world energy requirements and generation, specifically related to the cars Americans drive. (Subsequent reports will add Europe and Asian countries.)

The goal for many environmental, government and other groups seems to be concentrated on reducing energy needs. Truthfully, as under-developed and newly industrialized countries forge ahead with industrialization, the overall requirement for energy increases. Since automotive products are in high demand in those countries for various personal reasons, it is unlikely and improbable that an overall demand for energy will ever decrease.

So, in reality, the true issue is how energy is produced in ways that cause the least impact on society in general and can that energy be generated in as clean a way as possible?

The first step toward that goal is to understand that automobiles are not going to disappear from any roads anytime soon. And while many focus on “fuel efficiency,” that is only a small part of the total energy needed to design, develop, produce, drive and dispose of those vehicles. In fact, as the data shows, some of the less fuel efficient vehicles actually have extremely good Dust-to-Dust energy consumption requirements and conversely some hybrids – at least the current iterations of hybrids – are inferior in total energy demands while offering extremely high fuel efficiency.

This doesn’t mean that hybrids, for example, are a “bad choice.” That is NOT the intention of the research. What it does mean, however, is that a 2005 hybrid uses less gasoline and produced fewer tailpipe emissions, but costs society significantly more in overall energy costs than conventional Internal Combustion Engine (ICE) vehicles.

Example: If the consumer lives in the Los Angeles Basin, reducing smog and contending with some of the country's highest fuel costs make a hybrid a solid and logical vehicle choice. What consumers need to know, however, is that the LA Basin and the Los Angelino's wallet might benefit, the energy demands and pollution are exported somewhere else – either to the country of manufacture or to the states where the eventual vehicle will be disposed through recycling or scrap**.**

ABOUT THIS REPORT

This is a general-consumer report, not a technical document per se. It includes breakdowns of each vehicle's total energy requirements from Dust to Dust but does not include issues of gigajuelles, kW hours or other unfriendly (to consumers) terms. **Perhaps, in time, we will release our data in such technical terms. First, however, we will only look at the energy consumption cost.**

We will look at each section of the energy consumption for classes of models, individual examples and our own analysis of the data.

The information contained is as accurate as we can make it currently although we believe it has an error margin somewhere between 11 and 14 percent due to shifting production plans and new technologies being implemented in the salvage industry which includes recycled, non-recyclable and re-used vehicle components. Over time, we hope to be able to reduce that error margin as data becomes more easily available. There are some disclaimers and caveats which you can find in the Appendix section.

CHAPTER 1 – An Overview by Model

We will put the data into a consumer-friendly order by looking first at the total energy cost by model and work our way into more detail in subsequent chapters.

The sum result of the study shows that the Mercedes-Benz produced Maybach is the least energy efficient vehicle offered for sale in calendar year (cy) 2005 costing society more than $11.58 per mile driven. The least expensive was the Scion xB at less than $0.48 per mile.

It is important to note that the original owner of the vehicle doesn't pay this amount. The purpose here is to calculate the total energy requirements in a cents-per-mile matrix over its entire lifetime. Some parts of this cost, as we'll see, are borne by the auto company in a way that leverages future products while other costs are passed along to support industries such as tires, batteries, replacement parts, repair parts and disposal/scrappage.

Why doesn't the original buyer pay for this? We'll see in a subsequent chapter how second, third and other owners of this vehicle bear a large part of the cost. And the existence of such secondary sources of energy expenditures is justifiable because there is a market – a profitable market – for such goods and services resulting from the original buyer's vehicle selection.

For the time being, let's look at the data table below and what each of the columns means.

"Segment" is the part of the auto industry the particular vehicle is categorized as. That is, the Maybach is an "Ultra Luxury" passenger car while the Audi A6 is a "Luxury" model.

Legend to segments

	Small cars
b	Budget
e	Economy
	Mid-range cars
lmr	Lower Mid-range
smr	Standard Mid-range
pmr	Premium Mid-range
	Traditional cars
tr	Traditional
	Upscale cars
nl	Near Luxury
l	Luxury
p	Premium
u	Ultra
	Sporty cars
t	Touring
ps	Premium
ups	Upper Premium
ul	Ultra Luxury
	Alternative power cars
hy	Hybrid
ng	Natural Gas
	Alternative power trucks
hytr	Hybrid truck
	Sport-utility
elsw	Entry-level sport wagon
mrsw	Mid-range sport wagon
psw	Premium sport wagon
elsuv	Entry-level sport-utility
lmr suv	Lower mid-range sport-utility
umr suv	Upper mid-range sport-utility
lsuv	Large sport-utility
psuv	Premium sport-utility
sup	Sport-utility pickups
	Pickups
spu	Small
fspu	Full-sized
	Vans
mv	Mini
fsv	Full-sized

The second column (**Model**) is the actual model as it was known in cy2005. The "Dust to Dust E Cost per Mile" data is the total energy cost to society over the vehicle lifetime broken down to a cents-per-mile figure.

Finally, the **"Estimated Life in Miles"** is based on historical data as well as manufacturer information and real-world life-cycle information that average the miles over comparable historic models as well as a CNW analysis of repair and replacement as well as scrappage records. In effect, the miles figure here is a realistic approximation of the likely life-cycle of the individual models.

Note that there are clearly many consumers who have driven further and clocked more miles for some of these vehicles, but this information takes into account historic accident and disposal records for individual demographic groups and how long these vehicles are likely to last.

Why demographics are included in the life cycle.

Let's look at the Scion xB as an example. While touted as a "youth" vehicle, the reality is that this efficient small vehicle is seeing a growing number of buyers are over 65 years of age. It is more of a lifestyle vehicle than a pure economy car.

What is that lifestyle? Buyers – regardless of age – desire a compact exterior, roomy interior, ease of entry and egress, good fuel economy and low initial purchase cost. While initially this was thought to characterize the youth market, the reality is quite different. It also includes older consumers who live in generally fair weather climates and travel minimal distances in their daily excursions.

Because of its generally overall attractiveness to an older consumer group and the concentration of xBs in relatively fair weather climates, there is (as history and CNW data has shown) less likelihood of accidents and repairs yet because of its high acquisition by younger consumers there are lower incidents of regular energy-consuming maintenance (oil, tires, batteries, etc.).

In both the older and younger audiences, repair of minor damage to sheet metal is more often ignored thus similarly reducing the energy requirements on a Dust to Dust basis.

It should also be pointed out that on a Dust to Dust basis, the Estimated Miles doesn’t mean the vehicle is “used up” and has no life remaining, only that this is the approximate mileage at the time it is removed from the streets as a daily-use vehicle and sent for disposal as either a source of parts or eventually scrapped.

Dust to Dust Energy Report -- Automotive

Segment	Model	Dust to Dust E Cost Per Mile	Est. Life-Miles
U	Maybach	$ 11.582	257,000
L	Phaeton	$ 11.213	241,000
U	Rolls-Royce	$ 10.660	273,000
Ul	Bentley	$ 10.555	271,000
L	allroad quattro	$ 5.595	202,000
p	A8	$ 4.964	214,000
l	A6	$ 4.963	189,000
l	LS 430	$ 4.734	223,000
ul	Carrera GT	$ 4.528	186,000
ups	NSX	$ 4.453	192,000
l	GS 430	$ 4.416	181,000
l	Q45	$ 4.243	201,000
psuv	Cayenne	$ 4.146	193,000
psuv	Touareg	$ 4.134	186,000
ul	Lamborghini	$ 4.009	121,000
l	S-Type	$ 3.989	165,000
ps	SLK class	$ 3.982	159,000
ul	Ferrari	$ 3.962	119,000
l	M45	$ 3.876	126,000
l	GS 300	$ 3.861	131,000
ul	GT	$ 3.851	116,000
psuv	Range Rover	$ 3.775	206,000
psuv	G class	$ 3.711	237,000
lsuv	Sequoia	$ 3.672	175,000
p	S class	$ 3.669	251,000
ps	CLS class	$ 3.668	237,000
psuv	H1	$ 3.505	379,000
ps	CLK class	$ 3.492	191,000
l	DTS	$ 3.471	190,000
lsuv	Armada	$ 3.450	162,000
ups	SC 430	$ 3.407	165,000
l	DeVille	$ 3.385	203,000
psw	XC90	$ 3.325	229,000
l	E class	$ 3.313	256,000
psw	RX330	$ 3.306	192,000
l	Seville	$ 3.305	162,000
lsuv	Excursion	$ 3.304	269,000
l	80 series	$ 3.301	202,000
hy	Accord Hybrid	$ 3.295	117,000
ups	XLR	$ 3.276	164,000
hy	Prius	$ 3.249	109,000
hy	Civic Hybrid	$ 3.238	113,000
psuv	LX 470	$ 3.229	213,000
ps	Boxster	$ 3.224	157,000
psuv	Escalade ESV	$ 3.197	234,000
psuv	Land Cruiser	$ 3.184	301,000

Dust to Dust Energy Report -- Automotive

l	STS	$	3.175	216,000
ps	Corvette	$	3.158	162,000
l	5 Series	$	3.140	207,000
lsuv	Suburban	$	3.134	272,000
lsuv	Yukon XL	$	3.132	271,000
lsuv	Expedition	$	3.058	284,000
ups	XK	$	3.058	188,000
p	Maserati	$	3.055	162,000
psw	FX35/45	$	3.029	173,000
ul	Aston Martin	$	3.028	156,000
psuv	H2	$	3.027	197,000
psw	R class	$	2.960	164,000
hy	Insight	$	2.939	109,000
lsuv	Tahoe	$	2.937	268,000
psw	50 series	$	2.937	156,000
lsuv	Yukon	$	2.936	265,000
p	7 Series	$	2.936	201,000
psw	MDX	$	2.845	195,000
ups	911 Carrera 4	$	2.830	151,000
p	XJ	$	2.785	162,000
psw	SRX	$	2.782	171,000
mrsw	Pacifica	$	2.780	183,000
ps	TT	$	2.768	141,000
l	RL	$	2.762	164,000
l	Town Car	$	2.756	219,000
psuv	Escalade	$	2.753	239,000
ups	911 Carrera	$	2.738	164,000
ps	Z8	$	2.733	177,000
l	M3	$	2.727	143,000
lmr	Golf/GTI	$	2.697	151,000
fsv	Savana/G Van	$	2.692	272,000
fspu	Titan	$	2.691	169,000
fsv	Econoline/Club Wagon	$	2.686	258,000
umr suv	GX 470	$	2.686	177,000
ups	SL Coupe/Roadster	$	2.686	169,000
psuv	Navigator	$	2.617	201,000
lmr	L series	$	2.534	164,000
ups	CL class	$	2.533	188,000
umr suv	Discovery	$	2.525	203,000
mrsw	Murano	$	2.510	178,000
fspu	Tundra	$	2.509	191,000
mrsw	Highlander	$	2.490	156,000
umr suv	LR3	$	2.489	222,000
fspu	Ram pickup	$	2.484	231,000
ps	Z4	$	2.483	147,000
umr suv	QX4	$	2.483	151,000
fsv	Express/G Van	$	2.482	253,000
nl	70 series	$	2.482	185,000
t	RX8	$	2.482	139,000
psw	M class	$	2.482	215,000

Dust to Dust Energy Report -- Automotive

mrsw	Freestyle/Windstar	$	2.481	206,000
fspu	Silverado	$	2.450	239,000
fspu	Sierra	$	2.450	232,000
spu	SSR	$	2.442	143,000
umr suv	Range Rover Sport	$	2.420	206,000
fsv	Sprinter Van	$	2.420	381,000
lmr	Civic	$	2.420	178,000
lmr	HHR	$	2.397	169,000
mrsw	Rendezvous	$	2.392	168,000
fspu	F Series	$	2.392	268,000
psw	X5	$	2.368	166,000
umr suv	Aviator	$	2.347	191,000
lmr	G6	$	2.342	159,000
umr suv	Mountaineer	$	2.336	171,000
mv	EuroVan/T4	$	2.294	159,000
	Industry Straight Average	**$**	**2.281**	**178,739**
lmr	Classic	$	2.269	229,000
nl	60 series	$	2.269	161,000
psuv	QX56	$	2.269	16,900
fsv	Ram Van	$	2.267	227,000
ups	6 Series	$	2.267	173,000
ups	Lotus	$	2.267	121,000
mv	Odyssey	$	2.267	192,000
elsw	Outlander	$	2.266	183,000
psw	X3	$	2.264	167,000
pmr	Montego	$	2.264	152,000
pmr	LaCrosse	$	2.245	165,000
umr suv	B9 Tribeca	$	2.240	147,000
mv	Montana SV6	$	2.239	166,000
lmr	Impreza	$	2.225	137,000
lmr	Grand Am	$	2.224	192,000
lmr suv	Pathfinder	$	2.220	158,000
mv	Town & Country	$	2.218	171,000
elsw	Tucson	$	2.215	146,000
elsw	Tribute	$	2.212	153,000
mv	Terraza	$	2.212	179,000
lmr	Fusion	$	2.202	192,000
lmr	Milan	$	2.202	189,000
mrsw	Pilot	$	2.197	156,000
nl	Zephyr	$	2.196	179,000
umr suv	Envoy	$	2.196	202,000
fsv	Econoline van	$	2.195	281,000
lmr suv	4Runner	$	2.193	176,000
t	350Z	$	2.193	156,000
mv	Caravan/Grand Caravan	$	2.181	164,000
mv	Sienna	$	2.180	158,000
smr	Accord	$	2.180	209,000
umr suv	Rainier	$	2.180	176,000
lmr suv	Montero	$	2.177	157,000
ups	Viper	$	2.176	118,000

umr suv	9-7X	$	2.169	143,000
lmr	Stratus	$	2.165	201,000
mv	Venture	$	2.144	173,000
mv	Relay	$	2.143	162,000
mv	Montana	$	2.142	166,000
lmr suv	Montero Sport	$	2.123	142,000
nl	TL	$	2.122	171,000
mv	Quest	$	2.118	160,000
mv	Uplander	$	2.117	156,000
t	A3	$	2.096	139,000
t	Eclipse Spyder	$	2.079	119,000
mv	Freestar	$	2.069	161,000
mv	Monterey	$	2.069	159,000
pmr	Passat	$	2.052	192,000
sup	Escalade EXT	$	2.048	221,000
smr	*Jetta wagon*	$	2.046	136,000
nl	CL	$	2.022	182,000
elsuv	Xterra	$	2.022	191,000
t	Eclipse	$	2.021	144,000
elsw	Santa Fe	$	2.019	151,000
pmr	Magnum	$	2.019	183,000
pmr	Five Hundred	$	2.018	172,000
nl	LS	$	2.017	156,000
smr	*Jetta*	$	2.016	132,000
t	GTO	$	1.995	146,000
lmr	Optima	$	1.994	161,000
mv	Sedona	$	1.994	138,000
lmr	Sonata	$	1.980	162,000
sup	Avalanche	$	1.978	234,000
elsw	Torrent	$	1.974	162,000
mrsw	Endeavor	$	1.974	153,000
pmr	Charger	$	1.974	172,000
t	Celica	$	1.969	139,000
tr	Avalon	$	1.967	201,000
pmr	Maxima	$	1.966	193,000
pmr	300/300M	$	1.961	192,000
smr	Camry	$	1.954	198,000
mv	MPV	$	1.953	156,000
elsw	Escape	$	1.950	161,000
umr suv	H3	$	1.949	207,000
elsw	Mariner	$	1.948	151,000
elsw	RAV4	$	1.948	162,000
sup	Mark LT	$	1.944	192,000
pmr	Diamante	$	1.932	151,000
lmr	Malibu	$	1.919	163,000
smr	Baja	$	1.909	157,000
elsuv	Trooper	$	1.909	209,000
nl	X-Type	$	1.908	169,000
lmr	Verona	$	1.908	152,000
t	Mini Cooper S	$	1.908	161,000

Dust to Dust Energy Report -- Automotive

t	RSX	$	1.908	159,000
pmr	40 series	$	1.897	162,000
t	Solstice	$	1.880	153,000
nl	ES 330	$	1.852	172,000
pmr	I30/I35	$	1.851	188,000
smr	Legacy	$	1.849	156,000
elsw	Vue	$	1.847	161,000
nl	IS 300	$	1.833	162,000
lmr	Beetle	$	1.828	171,000
smr	Forester	$	1.825	165,000
elsw	Equinox	$	1.821	189,000
spu	Ridgeline	$	1.807	163,000
elsw	Element	$	1.807	142,000
pmr	Millenia	$	1.802	136,000
tr	Lucerne	$	1.802	177,000
smr	Mazda6	$	1.796	162,000
t	Mini Cooper	$	1.795	169,000
tr	Bonneville	$	1.782	183,000
nl	G35	$	1.777	172,000
pmr	A4/S4	$	1.774	169,000
smr	Intrepid	$	1.772	178,000
t	Mustang	$	1.758	181,000
lmr suv	Axiom	$	1.735	142,000
pmr	TSX	$	1.725	169,000
mv	Safari	$	1.725	202,000
mv	Astro	$	1.725	205,000
nl	C class	$	1.699	171,000
t	MR2 Spyder	$	1.683	162,000
nl	CTS	$	1.680	160,000
elsuv	Mazda5	$	1.679	171,000
lmr suv	Freelander	$	1.674	158,000
pmr	9-3	$	1.636	182,000
nl	330	$	1.616	176,000
lmr	PT Cruiser	$	1.612	192,000
nl	Park Avenue	$	1.556	179,000
pmr	9-2	$	1.553	171,000
elsw	Aztek	$	1.542	168,000
elsuv	Rodeo	$	1.542	184,000
tr	Concorde	$	1.531	183,000
lmr suv	Ascender	$	1.531	161,000
lmr suv	Commander	$	1.531	208,000
nl	325	$	1.531	171,000
nl	9-5	$	1.529	162,000
smr	Monte Carlo	$	1.506	189,000
lmr suv	Grand Cherokee	$	1.495	209,000
elsw	CR-V	$	1.478	156,000
elsuv	XL-7	$	1.477	165,000
ps	Thunderbird	$	1.477	171,000
t	MX-5 Miata	$	1.471	182,000
smr	Galant	$	1.465	153,000

Dust to Dust Energy Report -- Automotive

smr	Grand Prix	$	1.465	161,000
smr	Century	$	1.455	174,000
t	S2000	$	1.455	162,000
smr	Sable	$	1.447	201,000
smr	Taurus	$	1.446	206,000
t	Tiburon	$	1.439	192,000
lmr suv	Durango	$	1.429	184,000
tr	Grand Marquis	$	1.418	207,000
tr	Crown Victoria	$	1.417	212,000
elsuv	Grand Vitara	$	1.414	171,000
lmr suv	Explorer	$	1.404	203,000
smr	626	$	1.397	171,000
smr	Altima	$	1.381	153,000
tr	LeSabre	$	1.372	183,000
lmr suv	TrailBlazer	$	1.363	187,000
smr	Impala	$	1.357	174,000
ps	Crossfire	$	1.323	131,000
elsuv	Sorento	$	1.320	143,000
elsuv	Blazer	$	1.295	209,000
t	Firebird	$	1.287	173,000
t	Camaro	$	1.286	179,000
smr	XG350	$	1.285	151,000
lmr	Sebring	$	1.283	164,000
spu	Canyon	$	1.283	188,000
spu	Sonoma	$	1.283	187,000
smr	Amanti	$	1.263	162,000
elsuv	Vitara	$	1.257	158,000
elsuv	Rodeo Sport	$	1.225	162,000
elsuv	Sportage	$	1.168	159,000
pmr	Regal	$	1.167	152,000
spu	Frontier	$	1.160	171,000
spu	Tacoma	$	1.147	173,000
spu	Colorado	$	1.125	184,000
spu	Raider	$	1.124	175,000
elsuv	Liberty	$	1.099	189,000
spu	B-Series	$	1.088	193,000
spu	Dakota	$	1.014	172,000
e	Cobalt	$	1.013	169,000
e	Matrix **	$	1.011	162,000
lmr	Vibe	$	1.011	161,000
e	Mazda3	$	0.980	164,000
spu	Ranger	$	0.968	188,000
b	Rio	$	0.964	162,000
e	Sentra	$	0.962	164,000
e	Aerio	$	0.888	159,000
e	Lancer	$	0.872	154,000
e	Spectra	$	0.864	158,000
b	Accent	$	0.852	151,000
e	tC	$	0.845	139,000
e	Forenza	$	0.840	143,000

e	Focus	$	0.803	169,000
spu	S10	$	0.779	172,000
e	Protégé	$	0.772	161,000
b	Aveo	$	0.765	142,000
e	Sunfire	$	0.758	157,000
e	Cavalier	$	0.757	152,000
e	xA	$	0.736	156,000
e	Corolla	$	0.732	169,000
e	Neon	$	0.728	148,000
e	Elantra	$	0.723	162,000
e	Ion	$	0.709	161,000
b	Echo	$	0.703	157,000
elsuv	Tracker	$	0.694	153,000
elsuv	Wrangler	$	0.604	207,000
e	Escort	$	0.568	192,000
e	xB	$	0.478	189,000

It is important to look at the above data in a more organized way that consumers can understand and is more useful in terms of comparison.

Most new-vehicle buyers look at specific types of vehicles when hunting for a car or truck that suits their purposes. Some look for small sport utilities others look for mid-size sedans.

Beginning on the next page, the energy data is broken down by the various market segments as defined by *Automotive News.*

As the data show, there are two pieces of information consumers can use to make a vehicle choice decision. In the “Budget” car category, the most expensive Dust to Dust model is the Kia Rio at nearly $1 per mile while the least expensive is the Toyota Echo at about $0.70. While the Rio has a slightly longer Estimated Life-Miles than the Echo, the initial owner is unlikely to keep the vehicle for this length of time.

Dust to Dust Energy Report -- Automotive

Segment	Model	Dust to Dust E Cost Per Mile		Est. Life-Miles
b	Rio	$	0.964	162,000
b	Accent	$	0.852	151,000
b	Aveo	$	0.765	142,000
b	Echo	$	0.703	157,000
e	Cobalt	$	1.013	169,000
e	Matrix	$	1.011	162,000
e	Mazda3	$	0.980	164,000
e	Sentra	$	0.962	164,000
e	Aerio	$	0.888	159,000
e	Lancer	$	0.872	154,000
e	Spectra	$	0.864	158,000
e	tC	$	0.845	139,000
e	Forenza	$	0.840	143,000
e	Focus	$	0.803	169,000
e	Protégé	$	0.772	161,000
e	Sunfire	$	0.758	157,000
e	Cavalier	$	0.757	152,000
e	xA	$	0.736	156,000
e	Corolla	$	0.732	169,000
e	Neon	$	0.728	148,000
e	Elantra	$	0.723	162,000
e	Ion	$	0.709	161,000
e	Escort	$	0.568	192,000
e	xB	$	0.478	189,000
elsuv	Xterra	$	2.022	191,000
elsuv	Trooper	$	1.909	209,000
elsuv	Mazda5	$	1.679	171,000
elsuv	Rodeo	$	1.542	184,000
elsuv	XL-7	$	1.477	165,000
elsuv	Grand Vitara	$	1.414	171,000
elsuv	Sorento	$	1.320	143,000
elsuv	Blazer	$	1.295	209,000
elsuv	Vitara	$	1.257	158,000
elsuv	Rodeo Sport	$	1.225	162,000
elsuv	Sportage	$	1.168	159,000
elsuv	Liberty	$	1.099	189,000
elsuv	Tracker	$	0.694	153,000
elsuv	Wrangler	$	0.604	207,000
elsw	Outlander	$	2.266	183,000
elsw	Tucson	$	2.215	146,000
elsw	Tribute	$	2.212	153,000
elsw	Santa Fe	$	2.019	151,000
elsw	Torrent	$	1.974	162,000
elsw	Escape	$	1.950	161,000
elsw	Mariner	$	1.948	151,000

Dust to Dust Energy Report -- Automotive

elsw	RAV4	$	1.948	162,000
elsw	Vue	$	1.847	161,000
elsw	Equinox	$	1.821	189,000
elsw	Element	$	1.807	142,000
elsw	Aztek	$	1.542	168,000
elsw	CR-V	$	1.478	156,000
fspu	Titan	$	2.691	169,000
fspu	Tundra	$	2.509	191,000
fspu	Ram pickup	$	2.484	231,000
fspu	Silverado	$	2.450	239,000
fspu	Sierra	$	2.450	232,000
fspu	F Series	$	2.392	268,000
fsv	Savana/G Van	$	2.692	272,000
fsv	Econoline/Club Wagon	$	2.686	258,000
fsv	Express/G Van	$	2.482	253,000
fsv	Sprinter Van	$	2.420	381,000
fsv	Ram Van	$	2.267	227,000
fsv	Econoline van	$	2.195	281,000
hy	Accord Hybrid	$	3.295	117,000
hy	Prius	$	3.249	109,000
hy	Civic Hybrid	$	3.238	113,000
hy	Escape Hybrid	$	3.178	127,000
hy	Insight	$	2.939	109,000
l	Phaeton	$	11.213	241,000
l	allroad quattro	$	5.595	202,000
l	A6	$	4.963	189,000
l	LS 430	$	4.734	223,000
l	GS 430	$	4.416	181,000
l	Q45	$	4.243	201,000
l	S-Type	$	3.989	165,000
l	M45	$	3.876	126,000
l	GS 300	$	3.861	131,000
l	DTS	$	3.471	190,000
l	DeVille	$	3.385	203,000
l	E class	$	3.313	256,000
l	Seville	$	3.305	162,000
l	80 series	$	3.301	202,000
l	STS	$	3.175	216,000
l	5 Series	$	3.140	207,000
l	RL	$	2.762	164,000
l	Town Car	$	2.756	219,000
l	M3	$	2.727	143,000
lmr	Golf/GTI	$	2.697	151,000
lmr	L series	$	2.534	164,000
lmr	Civic	$	2.420	178,000

Dust to Dust Energy Report -- Automotive

lmr	HHR	$	2.397	169,000
lmr	G6	$	2.342	159,000
lmr	Classic	$	2.269	229,000
lmr	Impreza	$	2.225	137,000
lmr	Grand Am	$	2.224	192,000
lmr	Fusion	$	2.202	192,000
lmr	Milan	$	2.202	189,000
lmr	Stratus	$	2.165	201,000
lmr	Optima	$	1.994	161,000
lmr	Sonata	$	1.980	162,000
lmr	Malibu	$	1.919	152,000
lmr	Verona	$	1.908	171,000
lmr	Beetle	$	1.828	161,000
lmr	PT Cruiser	$	1.612	163,000
lmr	Sebring	$	1.283	192,000
lmr	Vibe	$	1.011	164,000
lmr suv	Pathfinder	$	2.220	158,000
lmr suv	4Runner	$	2.193	176,000
lmr suv	Montero	$	2.177	157,000
lmr suv	Montero Sport	$	2.123	142,000
lmr suv	Axiom	$	1.735	142,000
lmr suv	Freelander	$	1.674	158,000
lmr suv	Ascender	$	1.531	161,000
lmr suv	Commander	$	1.531	208,000
lmr suv	Grand Cherokee	$	1.495	209,000
lmr suv	Durango	$	1.429	184,000
lmr suv	Explorer	$	1.404	203,000
lmr suv	TrailBlazer	$	1.363	187,000
lsuv	Sequoia	$	3.672	175,000
lsuv	Armada	$	3.450	162,000
lsuv	Excursion	$	3.304	269,000
lsuv	Suburban	$	3.134	272,000
lsuv	Yukon XL	$	3.132	271,000
lsuv	Expedition	$	3.058	284,000
lsuv	Tahoe	$	2.937	268,000
lsuv	Yukon	$	2.936	265,000
mrsw	Pacifica	$	2.780	183,000
mrsw	Murano	$	2.510	178,000
mrsw	Highlander	$	2.490	156,000
mrsw	Freestyle/Windstar	$	2.481	206,000
mrsw	Rendezvous	$	2.392	168,000
mrsw	Pilot	$	2.197	156,000
mrsw	Endeavor	$	1.974	153,000
mv	EuroVan/T4	$	2.294	159,000
mv	Odyssey	$	2.267	192,000
mv	Montana SV6	$	2.239	166,000

Dust to Dust Energy Report -- Automotive

mv	Town & Country	$	2.218	171,000
mv	Terraza	$	2.212	179,000
mv	Caravan/Grand Caravan	$	2.181	164,000
mv	Sienna	$	2.180	158,000
mv	Venture	$	2.144	173,000
mv	Relay	$	2.143	162,000
mv	Montana	$	2.142	166,000
mv	Quest	$	2.118	160,000
mv	Uplander	$	2.117	156,000
mv	Freestar	$	2.069	161,000
mv	Monterey	$	2.069	159,000
mv	Sedona	$	1.994	138,000
mv	MPV	$	1.953	156,000
mv	Safari	$	1.725	202,000
mv	Astro	$	1.725	205,000
nl	70 series	$	2.482	185,000
nl	60 series	$	2.269	161,000
nl	Zephyr	$	2.196	179,000
nl	TL	$	2.122	171,000
nl	CL	$	2.022	182,000
nl	LS	$	2.017	156,000
nl	X-Type	$	1.908	169,000
nl	ES 330	$	1.852	172,000
nl	IS 300	$	1.833	162,000
nl	G35	$	1.777	172,000
nl	C class	$	1.699	171,000
nl	CTS	$	1.680	160,000
nl	330	$	1.616	176,000
nl	Park Avenue	$	1.556	179,000
nl	325	$	1.531	171,000
nl	9-5	$	1.529	162,000
p	A8	$	4.964	214,000
p	S class	$	3.669	251,000
p	Maserati	$	3.055	162,000
p	7 Series	$	2.936	201,000
p	XJ	$	2.785	162,000
pmr	Montego	$	2.264	152,000
pmr	LaCrosse	$	2.245	165,000
pmr	Passat	$	2.052	192,000
pmr	Magnum	$	2.019	183,000
pmr	Five Hundred	$	2.018	172,000
pmr	Charger	$	1.974	172,000
pmr	Maxima	$	1.966	193,000
pmr	300/300M	$	1.961	192,000
pmr	Diamante	$	1.932	151,000
pmr	40 series	$	1.897	162,000
pmr	I30/I35	$	1.851	188,000

pmr	Millenia	$	1.802	136,000
pmr	A4/S4	$	1.774	169,000
pmr	TSX	$	1.725	169,000
pmr	9-3	$	1.636	182,000
pmr	9-2	$	1.553	171,000
pmr	Regal	$	1.167	152,000
ps	SLK class	$	3.982	159,000
ps	CLS class	$	3.668	237,000
ps	CLK class	$	3.492	191,000
ps	Boxster	$	3.224	157,000
ps	Corvette	$	3.158	162,000
ps	TT	$	2.768	141,000
ps	Z8	$	2.733	177,000
ps	Z4	$	2.483	147,000
ps	Thunderbird	$	1.477	171,000
ps	Crossfire	$	1.323	131,000
psuv	Cayenne	$	4.146	193,000
psuv	Touareg	$	4.134	186,000
psuv	Range Rover	$	3.775	206,000
psuv	G class	$	3.711	237,000
psuv	H1	$	3.505	379,000
psuv	LX 470	$	3.229	213,000
psuv	Escalade ESV	$	3.197	234,000
psuv	Land Cruiser	$	3.184	301,000
psuv	H2	$	3.027	197,000
psuv	Escalade	$	2.753	239,000
psuv	Navigator	$	2.617	201,000
psuv	QX56	$	2.269	16,900
psw	XC90	$	3.325	229,000
psw	RX330	$	3.306	192,000
psw	FX35/45	$	3.029	173,000
psw	R class	$	2.960	164,000
psw	50 series	$	2.937	156,000
psw	MDX	$	2.845	195,000
psw	SRX	$	2.782	171,000
psw	M class	$	2.482	215,000
psw	X5	$	2.368	166,000
psw	X3	$	2.264	167,000
smr	Accord	$	2.180	209,000
smr	*Jetta wagon*	$	2.046	136,000
smr	*Jetta*	$	2.016	132,000
smr	Camry	$	1.954	198,000
smr	Baja	$	1.909	157,000
smr	Legacy	$	1.849	156,000
smr	Forester	$	1.825	165,000
smr	Mazda6	$	1.796	162,000

Dust to Dust Energy Report -- Automotive

smr	Intrepid	$	1.772	178,000
smr	Monte Carlo	$	1.506	189,000
smr	Galant	$	1.465	153,000
smr	Grand Prix	$	1.465	161,000
smr	Century	$	1.455	174,000
smr	Sable	$	1.447	201,000
smr	Taurus	$	1.446	206,000
smr	626	$	1.397	171,000
smr	Altima	$	1.381	153,000
smr	Impala	$	1.357	174,000
smr	XG350	$	1.285	151,000
smr	Amanti	$	1.263	162,000
spu	SSR	$	2.442	143,000
spu	Ridgeline	$	1.807	163,000
spu	Canyon	$	1.283	188,000
spu	Sonoma	$	1.283	187,000
spu	Frontier	$	1.160	171,000
spu	Tacoma	$	1.147	173,000
spu	Colorado	$	1.125	184,000
spu	Raider	$	1.124	175,000
spu	B-Series	$	1.088	193,000
spu	Dakota	$	1.014	172,000
spu	Ranger	$	0.968	188,000
spu	S10	$	0.779	172,000
sup	Escalade EXT	$	2.048	221,000
sup	Avalanche	$	1.978	234,000
sup	Mark LT	$	1.944	192,000
t	RX8	$	2.482	139,000
t	350Z	$	2.193	156,000
t	A3	$	2.096	139,000
t	Eclipse Spyder	$	2.079	119,000
t	Eclipse	$	2.021	144,000
t	GTO	$	1.995	146,000
t	Celica	$	1.969	139,000
t	Mini Cooper S	$	1.908	161,000
t	RSX	$	1.908	159,000
t	Solstice	$	1.880	153,000
t	Mini Cooper	$	1.795	169,000
t	Mustang	$	1.758	181,000
t	MR2 Spyder	$	1.683	162,000
t	MX-5 Miata	$	1.471	182,000
t	S2000	$	1.455	162,000
t	Tiburon	$	1.439	192,000
t	Firebird	$	1.287	173,000
t	Camaro	$	1.286	179,000
tr	Avalon	$	1.967	201,000

Dust to Dust Energy Report -- Automotive

tr	Lucerne	$	1.802	177,000
tr	Bonneville	$	1.782	183,000
tr	Concorde	$	1.531	183,000
tr	Grand Marquis	$	1.418	207,000
tr	Crown Victoria	$	1.417	212,000
tr	LeSabre	$	1.372	183,000
u	Maybach	$	11.582	257,000
u	Rolls-Royce	$	10.660	273,000
ul	Bentley	$	10.555	271,000
ul	Carrera GT	$	4.528	186,000
ul	Lamborghini	$	4.009	121,000
ul	Ferrari	$	3.962	119,000
ul	GT	$	3.851	116,000
ul	Aston Martin	$	3.028	156,000
umr suv	GX 470	$	2.686	177,000
umr suv	Discovery	$	2.525	203,000
umr suv	LR3	$	2.489	222,000
umr suv	QX4	$	2.483	151,000
umr suv	Range Rover Sport	$	2.420	206,000
umr suv	Aviator	$	2.347	191,000
umr suv	Mountaineer	$	2.336	171,000
umr suv	B9 Tribeca	$	2.240	147,000
umr suv	Envoy	$	2.196	202,000
umr suv	Rainier	$	2.180	176,000
umr suv	9-7X	$	2.169	143,000
umr suv	H3	$	1.949	207,000
ups	NSX	$	4.453	192,000
ups	SC 430	$	3.407	165,000
ups	XLR	$	3.276	164,000
ups	XK	$	3.058	188,000
ups	911 Carrera 4	$	2.830	151,000
ups	911 Carrera	$	2.738	164,000
ups	SL Coupe/Roadster	$	2.686	169,000
ups	CL class	$	2.533	188,000
ups	6 Series	$	2.267	173,000
ups	Lotus	$	2.267	121,000
ups	Viper	$	2.176	118,000
	Industry Straight Average	$	2.281	178,739

From purely a consumer auto-buy perspective, the first consideration has to be suitability of the vehicle to current driving needs. That narrows the field to the appropriate market segment or segments. **From that point on, while family budget will decide price and other conditions such as fuel economy expenses, somewhere in the equation that consumer *may* wish to include the overall energy cost to society. That, however, in our view, is a personal choice.**

Government, on the other hand, is a different matter. To offer incentives to a select group of vehicles under the guise of energy efficiency is misdirected because government is purported to represent all consumers, or society in general. Without at least the consideration of overall energy cost it is doing a disservice. If governments include Dust-to-Dust energy data and still decide to offer tax or other incentives, at least it would be a better informed choice.

As mentioned, however, if the goal is to reduce smog in specific region such as the LA Basin, hybrids could well be the logical choice for such incentives within the boundaries of logic.

For example, the most efficient fuel-economy and emission-reducing speed for most hybrids is below 35 mph. To encourage their use in high-speed, high-occupancy lanes where speeds are typically over 55 mph and the hybrid is operating solely on its gasoline engine offering only modest (if any) mpg advantages over comparably sized ICE-only small cars is simply illogical.

Similarly, tax breaks to high-density urban taxi companies for using hybrids (e.g. Escape) are a perfect use of such incentives.

But again, these decisions should be made with all factors considered.

CHAPTER TWO – The New-Vehicle Buyer Perspective

As mentioned, the original buyer of a new model is not being asked to pay for the entire life of that vehicle in terms of energy costs. This expense is spread over dozens of industries which, at various points, profit from being involved in the public use of cars and trucks.

Every stage of the automobile business has the potential to generate profit. Similarly, every stage requires energy consumption, be it the transportation of vehicles from plant to port to dealer to the maker of the crushing equipment that turns what once was a shiny new vehicle into a block of scrap “iron.”

The first buyer of that vehicle actually pays a small portion of the total energy cost. But his or her purchase supports many upstream and downstream companies ranging from the small plastic-fastener manufacturers to the dealership’s janitorial service.

Much of this cost is never recognized by the new-vehicle buyer. For example, buying a minivan is money in the bank for the tire and brake industries, for the quick-lube franchisee and government revenue departments. All will profit from this single purchase at some point in the near or medium and even long-term future.

And importantly, all will consume energy to support that individual new-car purchase over time. First by ordering, stocking and installing these maintenance and repair parts for vehicles years' old and eventually for that current new minivan. Second, by employing people who rely on energy for transport to and from work and third for the manufacturers of equipment for the support industries.

The mix of vehicles sold is as important as the total number of new vehicles purchased. For example, as the auto industry has discovered, profitability of large SUVs cannot be easily replaced if consumers elect instead to buy budget cars.

CNW has been tracking estimated profits per vehicle on a segment basis since 1999, but here is the latest data through the first quarter of 2006 compared to the two previous years.

Note that these are manufacturing profits excluding marketing costs such as incentives. Clearly a $2,000 incentive on a budget car that produces only $900 in manufacturing profit is a net-loss vehicle.

Manufacturing Profits (excluding marketing costs such as incentives)

	cy04	cy05	Q1 cy06
Budget Car	$ 810	$837	$916
Economy Car	$ 825	$818	$834
Entry-level sport-utility	$ 5,750	$5,439	$5,278
Entry-level sport wagon	$ 6,100	$6,246	$6,381
Full Size Pickup	$ 9,350	$10,867	$12,946
Full Size Van	$ 6,900	$6,455	$6,273
Hybrid Vehicles	$ 1,375	$1,486	$1,968
Luxury Car	$ 8,955	$9,148	$10,063
Lower Midrange	$ 1,250	$1,292	$1,406
Lower Mid Range SUV	$ 1,100	$987	$956
Large SUV	$ 10,975	$10,057	$9,382
Mid-range sport wagon	$ 7,900	$8,286	$9,045
Minivan	$ 5,275	$5,809	$6,227
Near Luxury Car	$ 8,975	$9,124	$9,163
Premium Car	$ 19,800	$21,315	$22,774
Premium Mid Range Car	$ 9,010	$9,246	$9,482
Premium Sporty Car	$ 8,250	$8,671	$8,739
Premium SUV	$ 13,250	$12,776	$11,937
Premium Sportwagon	$ 7,450	$7,669	$8,004
Standard Mid Range	$ 3,860	$4,226	$4,419
Small Pickup	$ 970	$953	$969
Sport Utility Pickup	$ 7,610	$7,773	$7,851
Touring Car	$ 7,150	$7,226	$7,426
Traditional Car	$ 7,725	$7,854	$7,891
Ultra Upscale Car	$ 32,850	$33,441	$35,483
Ultra Luxury Sporty Car	$ 9,475	$10,044	$10,357
Upper Mid Range SUV	$ 9,250	$8,967	$8,864
Upper Premium Sporty Car	$ 21,750	$21,643	$21,473

Source: CNW Marketing Research, Inc.

Note that the above figures represent the difference between the manufacturing cost and the price an automaker receives from a franchised dealer. Franchised dealers do not receive this amount or any amount close to this when selling to a consumer.

So, to take this analysis to the next stage, here are the average retail transaction prices paid for each model in calendar year 2005 along with the estimated life in miles and the average years of service along with the lifetime average annual mileage.

Once again, the caveat is this: These are general averages. Many consumers exceed these figures; many do not.

Division	Model	New Avg Trans Prc		Est. Life-Miles*	Lifetime Avg Miles/Yr	Years of Service
Kia	Rio	$	12,947	162,000	10,989	14.74
Hyundai	Accent	$	12,668	151,000	10,521	14.35
Chevrolet	Aveo	$	12,624	142,000	13,503	10.52
Toyota	Echo	$	11,217	157,000	12,775	12.29
	Total Budget Cars	**$**	**12,364**	**153,000**	**11,947**	**12.98**
Chevrolet	Cobalt	$	16,791	169,000	10,376	16.29
Toyota	Matrix **	$	17,421	162,000	11,018	14.70
Mazda	Mazda3	$	16,375	164,000	10,238	16.02
Nissan	Sentra	$	15,972	164,000	10,523	15.58
Suzuki	Aerio	$	15,112	159,000	12,328	12.90
Mitsubishi	Lancer	$	16,743	154,000	12,868	11.97
Kia	Spectra	$	15,645	158,000	13,520	11.69
Scion	tC	$	16,942	139,000	12,591	11.04
Suzuki	Forenza	$	16,118	143,000	11,142	12.83
Ford	Focus	$	16,372	169,000	11,278	14.98
Mazda	Protégé	$	14,628	161,000	10,631	15.14
Pontiac	Sunfire	$	15,925	157,000	12,625	12.44
Chevrolet	Cavalier	$	15,678	152,000	13,136	11.57
Scion	xA	$	13,151	156,000	11,255	13.86
Toyota	Corolla	$	15,873	169,000	13,242	12.76
Dodge	Neon	$	15,424	148,000	10,624	13.93
Hyundai	Elantra	$	15,333	162,000	12,422	13.04
Saturn	Ion	$	15,002	161,000	13,248	12.15
Ford	Escort	$	14,522	192,000	12,548	15.30
Scion	xB	$	14,971	189,000	12,494	15.13
	Total Economy Cars	**$**	**15,700**	**161,400**	**11,905**	**13.67**
Nissan	Xterra	$	24,528	191,000	13,194	14.48
Isuzu	Trooper	$	26,524	209,000	13,806	15.14
Mazda	Mazda5	$	18,742	171,000	13,319	12.84

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Isuzu	Rodeo	$	19,474	184,000	13,306	13.83
Suzuki	XL-7	$	25,280	165,000	12,430	13.27
Suzuki	Grand Vitara	$	23,642	171,000	13,904	12.30
Kia	Sorento	$	24,427	143,000	11,986	11.93
Chevrolet	Blazer	$	20,268	209,000	13,754	15.20
Suzuki	Vitara	$	18,942	158,000	13,152	12.01
Isuzu	Rodeo Sport	$	19,556	162,000	12,163	13.32
Kia	Sportage	$	21,111	159,000	13,083	12.15
Jeep	Liberty	$	26,092	189,000	11,867	15.93
Chevrolet	Tracker	$	18,567	153,000	11,751	13.02
Jeep	Wrangler	$	25,375	207,000	13,024	15.89
	Ttl Entry Level SUVs	**$**	**22,323**	**176,500**	**12,910**	**13.66**
Mitsubishi	Outlander	$	22,663	183,000	13,501	13.55
Hyundai	Tucson	$	22,427	146,000	13,414	10.88
Mazda	Tribute	$	23,159	153,000	11,504	13.30
Hyundai	Santa Fe	$	24,874	151,000	12,960	11.65
Pontiac	Torrent	$	23,027	162,000	12,891	12.57
Ford	Escape	$	23,627	161,000	13,927	11.56
Mercury	Mariner	$	23,942	151,000	12,486	12.09
Toyota	RAV4	$	23,649	162,000	12,075	13.42
Saturn	Vue	$	22,209	161,000	12,229	13.17
Chevrolet	Equinox	$	24,273	189,000	12,567	15.04
Honda	Element	$	19,745	142,000	13,780	10.30
Pontiac	Aztek	$	22,206	168,000	11,709	14.35
Honda	CR-V	$	24,514	156,000	11,448	13.63
	Ttl Entry Level Sportwagons	**$**	**23,101**	**160,385**	**12,653**	**12.73**
Nissan	Titan	$	31,428	169,000	14,239	11.87
Toyota	Tundra	$	30,664	191,000	12,859	14.85
Dodge	Ram pickup	$	38,622	231,000	13,459	17.16
Chevrolet	Silverado	$	32,741	239,000	12,947	18.46
GMC	Sierra	$	35,226	232,000	13,067	17.75
Ford	F Series	$	37,627	268,000	12,782	20.97
	Ttl Full Size Pickup	**$**	**34,385**	**221,667**	**13,226**	**16.84**
GMC	Savana/G Van	$	26,372	272,000	21,038	12.93
Ford	Econoline/Club Wagon	$	30,042	258,000	20,148	12.81
GMC	Express/G Van	$	27,617	253,000	20,231	12.51
Dodge	Sprinter Van	$	34,638	381,000	19,420	19.62
Dodge	Ram Van	$	25,622	227,000	19,315	11.75
Ford	Econoline van	$	28,625	281,000	19,069	14.74
	Full Size Van	**$**	**28,819**	**278,667**	**19,870**	**14.06**
Honda	Accord Hybrid	$	30,216	117,000	10,462	11.18
Toyota	Prius	$	23,142	109,000	9,146	11.92
Honda	Civic Hybrid	$	23,627	113,000	11,837	9.55

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Ford	Escape Hybrid	$	26,472	141,000	11,238	12.55
Mercury	Mariner Hybrid	$	28,229	138,000	11,942	11.56
Honda	Insight	$	20,234	109,000	8,241	13.23
Lexus	RX 400h	$	46,217	192,000	12,627	15.21
Toyota	Highlander Hybrid	$	36,424	140,000	12,069	11.60
	Ttl Hybrids	**$**	**29,320**	**132,375**	**10,945**	**12.10**
Volkswagen	Phaeton	$	99,424	241,000	9,342	25.80
Audi	allroad quattro	$	45,547	202,000	9,791	20.63
Audi	A6	$	51,391	189,000	12,841	14.72
Lexus	LS 430	$	55,728	223,000	12,092	18.44
Lexus	GS 430	$	50,342	181,000	11,792	15.35
Infiniti	Q45	$	56,824	201,000	13,087	15.36
Jaguar	S-Type	$	45,637	165,000	11,910	13.85
Infiniti	M45	$	45,639	126,000	11,662	10.80
Lexus	GS 300	$	44,405	131,000	12,700	10.31
Cadillac	DTS	$	46,537	190,000	13,080	14.53
Cadillac	DeVille	$	41,371	203,000	13,101	15.50
M-Benz	E class	$	61,868	256,000	12,894	19.85
Cadillac	Seville	$	41,231	162,000	13,168	12.30
Volvo	80 series	$	38,195	202,000	12,552	16.09
Cadillac	STS	$	46,824	216,000	11,910	18.14
BMW	5 Series	$	40,206	207,000	12,677	16.33
Acura	RL	$	51,357	164,000	12,574	13.04
Lincoln	Town Car	$	45,283	219,000	11,910	18.39
BMW	M3	$	46,895	143,000	11,837	12.08
	Total Luxury Car	**$**	**50,248**	**190,579**	**12,154**	**15.87**
Volkswagen	Golf	$	21,648	151,000	11,114	13.59
Volkswagen	Golf GTI	$	24,813	144,000	10,869	13.25
Saturn	L series	$	19,469	164,000	10,974	14.94
Honda	Civic	$	22,319	178,000	11,536	15.43
Chevrolet	HHR	$	17,914	169,000	11,573	14.60
Pontiac	G6	$	20,303	159,000	10,754	14.79
Chevrolet	Classic	$	19,633	229,000	11,318	20.23
Subaru	Impreza	$	23,618	137,000	11,228	12.20
Pontiac	Grand Am	$	21,946	192,000	10,700	17.94
Ford	Fusion	$	20,234	192,000	11,923	16.10
Mercury	Milan	$	21,553	189,000	11,408	16.57
Dodge	Stratus	$	19,424	201,000	11,855	16.95
Kia	Optima	$	17,556	161,000	10,901	14.77
Hyundai	Sonata	$	19,742	162,000	12,031	13.47
Suzuki	Verona	$	18,742	152,000	10,663	14.25
Volkswagen	Beetle	$	19,894	171,000	11,188	15.28
Pontiac	Vibe	$	18,456	161,000	11,523	13.97
Chevrolet	Malibu	$	22,443	163,000	11,758	13.86
Chrysler	PT Cruiser	$	23,131	192,000	11,008	17.44
Chrysler	Sebring	$	18,494	164,000	11,987	13.68
	Ttl Lower Mid-Range Cars	**$**	**20,567**	**171,550**	**11,316**	**15.17**

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Nissan	Pathfinder	$	32,914	158,000	10,661	14.82
Toyota	4Runner	$	36,876	176,000	11,577	15.20
Mitsubishi	Montero	$	34,223	157,000	10,850	14.47
Mitsubishi	Montero Sport	$	29,416	142,000	11,207	12.67
Isuzu	Axiom	$	28,772	142,000	10,436	13.61
Land Rover	Freelander	$	25,372	158,000	11,283	14.00
Isuzu	Ascender	$	26,533	161,000	11,177	14.40
Jeep	Commander	$	36,781	208,000	11,197	18.58
Jeep	Grand Cherokee	$	40,028	209,000	10,736	19.47
Jeep	Grand Cherokee SRT-8	$	41,919	182,000	11,079	16.43
Dodge	Durango	$	31,627	184,000	10,815	17.01
Ford	Explorer	$	31,416	203,000	10,630	19.10
Chevrolet	TrailBlazer	$	27,226	187,000	11,581	16.15
	Ttl Lower Mid-Range SUV	**$**	**32,546**	**174,385**	**11,018**	**15.84**
Toyota	Sequoia	$	41,915	175,000	13,101	13.36
Nissan	Armada	$	39,737	162,000	13,533	11.97
Ford	Excursion	$	48,333	269,000	14,790	18.19
Chevrolet	Suburban	$	41,086	272,000	14,542	18.70
GMC	Yukon XL	$	49,867	271,000	12,802	21.17
Ford	Expedition	$	44,540	284,000	14,736	19.27
Chevrolet	Tahoe	$	38,719	268,000	14,228	18.84
GMC	Yukon	$	42,097	265,000	14,484	18.30
	Total Large SUV	**$**	**43,287**	**245,750**	**14,027**	**17.47**
Chrysler	Pacifica	$	30,216	183,000	14,492	12.63
Nissan	Murano	$	30,229	178,000	13,551	13.14
Toyota	Highlander	$	29,473	156,000	12,822	12.17
Ford	Freestyle/Windstar	$	27,111	206,000	12,251	16.81
Buick	Rendezvous	$	27,637	168,000	12,683	13.25
Honda	Pilot	$	31,946	156,000	14,469	10.78
Mitsubishi	Endeavor	$	31,742	153,000	12,867	11.89
	Total Mid-Range Sportwagons	**$**	**29,765**	**171,429**	**13,305**	**12.95**
Volkswagen	EuroVan/T4	$	36,728	159,000	12,266	12.96
Honda	Odyssey	$	34,668	192,000	12,584	15.26
Pontiac	Montana SV6	$	25,711	166,000	12,495	13.29
Chrysler	Town & Country	$	34,423	171,000	12,511	13.67
Buick	Terraza	$	32,451	179,000	12,497	14.32
Dodge	Caravan/Grand Caravan	$	26,182	164,000	12,369	13.26
Toyota	Sienna	$	34,762	158,000	12,247	12.90
Chevrolet	Venture	$	24,317	173,000	12,401	13.95
Saturn	Relay	$	27,348	162,000	12,880	12.58
Pontiac	Montana	$	25,415	166,000	12,017	13.81
Nissan	Quest	$	31,467	160,000	12,969	12.34
Chevrolet	Uplander	$	32,411	156,000	12,238	12.75
Ford	Freestar	$	22,234	161,000	12,723	12.65

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Mercury	Monterey	$	27,276	159,000	13,098	12.14
Kia	Sedona	$	24,868	138,000	12,344	11.18
Mazda	MPV	$	27,129	156,000	12,549	12.43
GMC	Safari	$	23,142	202,000	12,760	15.83
Chevrolet	Astro	$	24,773	205,000	12,550	16.33
	Total Minivans	**$**	**28,628**	**$ 168,167**	**12,528**	**13.43**
Volvo	70 series	$	37,915	185,000	12,509	14.79
Volvo	60 series	$	35,562	161,000	13,423	11.99
Mercury	Zephyr	$	28,756	179,000	12,239	14.63
Acura	TL	$	34,151	171,000	12,691	13.47
Acura	CL	$	32,627	182,000	13,068	13.93
Lincoln	LS	$	35,718	156,000	12,962	12.04
Jaguar	X-Type	$	33,114	169,000	12,346	13.69
Lexus	ES 330	$	31,528	172,000	12,326	13.95
Lexus	IS 300	$	34,721	162,000	12,356	13.11
Infiniti	G35	$	32,756	172,000	13,165	13.06
M-Benz	C class	$	38,550	171,000	12,723	13.44
Cadillac	CTS	$	31,759	160,000	13,080	12.23
BMW	330	$	35,281	176,000	12,416	14.18
Buick	Park Avenue	$	38,375	179,000	13,343	13.42
BMW	325	$	36,881	171,000	12,845	13.31
Saab	9-5	$	35,447	162,000	13,443	12.05
	Total Near Luxury Cars	**$**	**34,571**	**$ 170,500**	**$ 12,808**	**13.33**
Audi	A8	$	89,726	214,000	11,193	19.12
M-Benz	S class	$	124,347	251,000	11,438	21.94
Maserati	Maserati	$	114,913	162,000	11,695	13.85
BMW	7 Series	$	107,372	201,000	11,522	17.44
Jaguar	XJ	$	77,575	162,000	11,667	13.89
	Total Premium Cars	**$**	**102,787**	**$ 198,000**	**$ 11,503**	**17.25**
Mercury	Montego	$	27,537	152,000	13,388	11.35
Buick	LaCrosse	$	27,924	165,000	13,631	12.10
Volkswagen	Passat	$	30,065	192,000	13,426	14.30
Dodge	Magnum	$	28,334	183,000	12,251	14.94
Ford	Five Hundred	$	23,192	172,000	13,966	12.32
Dodge	Charger	$	24,698	172,000	13,033	13.20
Nissan	Maxima	$	28,111	193,000	12,825	15.05
Chrysler	300/300M	$	30,741	192,000	13,911	13.80
Mitsubishi	Diamante	$	26,513	151,000	12,192	12.39
Volvo	40 series	$	25,413	162,000	12,596	12.86
Infiniti	I30/I35	$	29,842	188,000	12,112	15.52
Mazda	Millenia	$	27,627	136,000	13,601	10.00
Audi	A4/S4	$	36,493	169,000	13,971	12.10
Audi	S4	$	56,371	171,000	13,402	12.76
Acura	TSX	$	28,735	169,000	12,414	13.61
Saab	9-3	$	30,137	182,000	12,673	14.36

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Saab	9-2	$	25,766	171,000	13,566	12.61
Buick	Regal	$	23,516	152,000	12,230	12.43
	Total Premium Mid-Range Cars	**$**	**29,501**	**170,667**	**13,066**	**13.09**
M-Benz	SLK class	$	44,888	159,000	11,975	13.28
M-Benz	CLS class	$	62,731	237,000	10,815	21.91
M-Benz	CLK class	$	53,438	191,000	11,333	16.85
Porsche	Boxster	$	52,619	157,000	11,847	13.25
Chevrolet	Corvette	$	60,238	162,000	11,694	13.85
Audi	TT	$	41,427	141,000	11,398	12.37
BMW	Z8	$	50,274	177,000	11,481	15.42
BMW	Z4	$	38,622	147,000	10,864	13.53
Ford	Thunderbird	$	36,279	171,000	10,164	16.82
Chrysler	Crossfire	$	31,208	131,000	11,918	10.99
	Total Premium Sporty Cars	**$**	**47,172**	**167,300**	**11,349**	**14.83**
Porsche	Cayenne	$	101,347	193,000	10,638	18.14
Volkswagen	Touareg	$	40,669	186,000	9,825	18.93
Land Rover	Range Rover	$	88,543	206,000	10,735	19.19
M-Benz	G class	$	92,317	237,000	10,381	22.83
Hummer	H1	$	136,552	379,000	10,841	34.96
Lexus	LX 470	$	66,193	213,000	10,919	19.51
Cadillac	Escalade ESV	$	70,361	234,000	10,252	22.82
Toyota	Land Cruiser	$	54,372	301,000	10,709	28.11
Hummer	H2	$	54,789	197,000	10,684	18.44
Cadillac	Escalade	$	58,731	239,000	10,324	23.15
Lincoln	Navigator	$	52,006	201,000	11,166	18.00
	Total Premium SUV	**$**	**74,171**	**235,091**	**10,589**	**22.19**
Volvo	XC90	$	46,283	229,000	14,477	15.82
Lexus	RX330	$	37,215	192,000	13,609	14.11
Infiniti	FX35	$	39,217	173,000	13,884	12.46
Infiniti	FX45	$	49,292	177,000	12,752	13.88
M-Benz	R class	$	51,366	164,000	13,074	12.54
Volvo	50 series	$	28,555	156,000	13,797	11.31
Acura	MDX	$	42,518	195,000	12,874	15.15
Cadillac	SRX	$	43,914	171,000	14,882	11.49
M-Benz	M class	$	45,737	215,000	14,938	14.39
BMW	X5	$	67,912	166,000	13,183	12.59
BMW	X3	$	33,225	167,000	13,621	12.26
	Total Premium Sportwagons	**$**	**44,112**	**182,273**	**13,736**	**13.27**
Honda	Accord	$	29,167	209,000	12,938	16.15
Volkswagen	Jetta wagon	$	21,723	136,000	13,931	9.76
Volkswagen	Jetta	$	23,539	132,000	13,109	10.07
Toyota	Camry	$	26,432	198,000	13,518	14.65
Subaru	Baja	$	23,817	157,000	13,799	11.38

Subaru	Legacy	$	29,415	156,000	14,048	11.10
Subaru	Forester	$	26,336	165,000	13,199	12.50
Subaru	Outback	$	31,123	158,000	13,638	11.59
Mazda	Mazda6	$	25,573	162,000	13,824	11.72
Dodge	Intrepid	$	19,624	178,000	13,971	12.74
Chevrolet	Monte Carlo	$	26,861	189,000	13,262	14.25
Mitsubishi	Galant	$	24,483	153,000	13,538	11.30
Pontiac	Grand Prix	$	26,538	161,000	14,227	11.32
Buick	Century	$	19,684	174,000	13,104	13.28
Mercury	Sable	$	19,866	201,000	14,193	14.16
Ford	Taurus	$	19,735	206,000	14,001	14.71
Mazda	626	$	20,041	171,000	14,245	12.00
Nissan	Altima	$	25,295	153,000	13,982	10.94
Chevrolet	Impala	$	25,404	174,000	13,159	13.22
Hyundai	XG350	$	23,117	151,000	14,028	10.76
Kia	Amanti	$	22,868	162,000	13,512	11.99
	Total Small Mid-Range Cars	**$**	**24,316**	**168,857**	**13,677**	**12.36**
Chevrolet	SSR	$	32,318	143,000	12,672	11.28
Honda	Ridgeline	$	30,147	163,000	12,624	12.91
GMC	Canyon	$	21,374	188,000	12,953	14.51
GMC	Sonoma	$	22,069	187,000	12,104	15.45
Nissan	Frontier	$	23,743	171,000	12,963	13.19
Toyota	Tacoma	$	16,890	173,000	13,036	13.27
Chevrolet	Colorado	$	22,314	184,000	12,107	15.20
Mitsubishi	Raider	$	29,642	175,000	11,962	14.63
Mazda	B-Series	$	21,747	193,000	12,912	14.95
Dodge	Dakota	$	24,768	172,000	11,949	14.39
Ford	Ranger	$	19,347	188,000	12,751	14.74
Chevrolet	S10	$	18,294	172,000	12,840	13.40
	Total Small Pickup	**$**	**23,554**	**175,750**	**12,573**	**13.99**
Cadillac	Escalade EXT	$	56,914	221,000	11,986	18.44
Chevrolet	Avalanche	$	32,553	234,000	11,451	20.43
Lincoln	Mark LT	$	40,420	192,000	11,836	16.22
	Total Specialty Utility Pickup	**$**	**43,296**	**215,667**	**11,758**	**18.36**
Mazda	RX8	$	27,351	139,000	10,000	13.90
Nissan	350Z	$	36,228	156,000	10,729	14.54
Audi	A3	$	30,304	139,000	10,804	12.87
Mitsubishi	Eclipse Spyder	$	31,142	119,000	10,934	10.88
Mitsubishi	Eclipse	$	21,164	144,000	10,643	13.53
Pontiac	GTO	$	27,527	146,000	10,641	13.72
Toyota	Celica	$	21,629	139,000	10,777	12.90
Mini	Mini Cooper S	$	21,343	161,000	10,446	15.41
Acura	RSX	$	22,555	159,000	10,407	15.28
Pontiac	Solstice	$	21,367	153,000	10,567	14.48
Mini	Mini Cooper	$	21,693	169,000	10,936	15.45

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Ford	Mustang	$	27,756	181,000	10,475	17.28
Toyota	MR2 Spyder	$	23,067	162,000	10,832	14.96
Mazda	MX-5 Miata	$	24,448	182,000	10,812	16.83
Honda	S2000	$	30,837	162,000	10,997	14.73
Hyundai	Tiburon	$	17,639	192,000	10,610	18.10
Pontiac	Firebird	$	24,831	173,000	10,141	17.06
Chevrolet	Camaro	$	25,639	179,000	10,262	17.44
	Total Touring	**$**	**25,362**	**158,611**	**10,612**	**14.96**
Toyota	Avalon	$	30,346	201,000	13,880	14.48
Buick	Lucerne	$	32,994	177,000	15,041	11.77
Pontiac	Bonneville	$	28,615	183,000	14,686	12.46
Chrysler	Concorde	$	26,578	183,000	14,239	12.85
Mercury	Grand Marquis	$	25,739	207,000	14,429	14.35
Ford	Crown Victoria	$	23,253	212,000	14,123	15.01
Buick	LeSabre	$	24,914	183,000	14,711	12.44
	Total Traditional Car	**$**	**27,491**	**192,286**	**14,444**	**13.34**
Maybach	Maybach	$	379,428	257,000	11,155	23.04
Rolls-Royce	Rolls-Royce	$	329,192	273,000	11,268	24.23
Bentley	Bentley	$	172,538	271,000	11,094	24.43
Porsche	Carrera GT	$	461,724	186,000	11,391	16.33
Lamborghini	Lamborghini	$	201,064	121,000	11,061	10.94
Ferrar	Ferrari	$	255,229	119,000	11,237	10.59
Ford	GT	$	136,777	116,000	11,252	10.31
Aston Martin	Aston Martin	$	241,308	156,000	11,251	13.87
	Total Ultra Luxury	**$**	**272,158**	**187,375**	**11,214**	**16.72**
Lexus	GX 470	$	44,221	177,000	14,127	12.53
Land Rover	Discovery	$	44,348	203,000	13,805	14.70
Land Rover	LR3	$	47,365	222,000	13,564	16.37
Infiniti	QX4	$	42,710	151,000	14,278	10.58
Land Rover	Range Rover Sport	$	65,409	206,000	13,428	15.34
Lincoln	Aviator	$	38,893	191,000	14,386	13.28
Mercury	Mountaineer	$	32,163	171,000	13,919	12.29
Subaru	B9 Tribeca	$	32,179	147,000	14,111	10.42
GMC	Envoy	$	35,491	202,000	14,108	14.32
Buick	Rainier	$	30,606	176,000	13,984	12.59
Saab	9-7X	$	39,217	143,000	13,234	10.81
Hummer	H3	$	32,107	207,000	13,543	15.28
	Total Upper Mid-Range SUV	**$**	**40,392**	**183,000**	**13,874**	**13.21**
Acura	NSX	$	91,263	192,000	10,269	18.70
M-Benz	SC 430	$	64,001	165,000	10,607	15.56
Cadillac	XLR	$	76,224	164,000	10,209	16.06
Jaguar	XK	$	78,437	188,000	10,871	17.29

Porsche	911 Carrera 4	$	86,472	151,000	11,382	13.27
Porsche	911 Carrera	$	70,214	164,000	10,505	15.61
M-Benz	SL Coupe/Roadster	$	165,819	169,000	11,145	15.16
M-Benz	CL class	$	117,225	188,000	9,618	19.55
BMW	6 Series	$	68,912	173,000	10,936	15.82
Lotus	Lotus	$	48,693	121,000	10,518	11.50
Dodge	Viper	$	84,573	118,000	11,321	10.42
	Total Upper Premium Sportscars	**$**	**86,530**	**163,000**	**10,671**	**15.36**
	Industry Straight Average	**$**	**44,269**	**193,204**	**13,423**	**15.66**

One thing is clear. The typical hybrid small vehicle such as the Prius is driven far fewer miles each year than a comparably sized budget car. And for good reason. Like Upper Premium Sports cars, these are generally secondary vehicles in a household OR they are driven in restricted or short range environments such as college campuses or retirement neighborhoods. Clearly both of those are generalizations and there are exceptions, but nonetheless this is a reality of automotive use.

Based on the average mileage and life expectancy, there is a wide range of years that certain models will be on the road before being scrapped. This ranges from a low of 10 years to as much as 20-plus years. As segments, the lowest number of years are Hybrid models as a group (12.1 years) while the highest segment is Premium SUVs such as the Range Rover and Hummer H2 (22.2 years).

There are reasons for this within the context of this study. (Again, we are discussing calendar year 2005 only.)

First, and foremost, many of the hybrid models – such as the Insight and Prius – are early renditions of the technology that are being or soon will be replaced by more efficient and less complicated versions effectively making the current versions obsolete within a few short years.

Second, early-generation new technology loses maintenance support quicker than old technology and makes repair financially unacceptable. In-home laser printers are a good example of this. It is currently nonsensical to perform significant repairs on a Minolta QMS laser printer since the replacement cost would likely be less than the repair cost.

Nor does it make sense to repair a HP Laser Jet printer for precisely the same reason: One can replace it with a smaller, faster, lighter version for less financial outlay.

Instead, both of these laser printers are relegated to the scrap heap. The energy expended to make these printers doesn't have the benefit of being passed along to a second, third or fourth market down steam where it would be amortized in the grand scheme of energy usage. Instead, the disposal cost becomes higher than the original energy necessary to manufacture either.

The same is true with early hybrids. As we'll see later, repair costs – and thus energy expenditures -- are extremely high for current hybrid models. That in turn will mean a shorter overall life cycle before being sent to the recycling and/or scrap industries.

As the following table shows, based on historic ownership patterns as tracked by CNW, the typical first owner retains a model in the household for an average of 6 years. During this time, the car or truck is likely to move from a primary vehicle in that household to secondary or third status; from the head-of-household's vehicle to transportation for some other member.

Regardless of the movement within a household, the vehicle tends to spend only a third of its entire lifetime in the hands of the originally buyer.

Some vehicles have significantly higher first-owner retention while others have less.

This is an important component in the Dust to Dust study because the movement of a vehicle through the marketplace adds to the overall energy costs. Put simply, the longer a vehicle remains in the hands of the first buyer, the less impact it has on global or social energy consumption.

(Note: We've adjusted the "overall average" to reflect pass-along sales to family members who no longer are in the household.)

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Segment	Division	Model	First Owner Share of Ttl Veh Life (Yrs)	Subsequent Owners Shr Ttl Life	First Owner Share as % of Life
b	**Kia**	Rio	5.49	9.25	37.2%
b	**Hyundai**	Accent	5.85	8.50	40.8%
b	**Chevrolet**	Aveo	5.45	5.07	51.8%
b	**Toyota**	Echo	5.63	6.66	45.8%
		Total Budget Cars	**5.60**	**7.37**	**43.2%**
e	**Chevrolet**	Cobalt	5.44	10.84	33.4%
e	**Toyota**	Matrix **	5.47	9.24	37.2%
e	**Mazda**	Mazda3	5.56	10.46	34.7%
e	**Nissan**	Sentra	5.96	9.62	38.3%
e	**Suzuki**	Aerio	5.69	7.21	44.1%
e	**Mitsubishi**	Lancer	5.86	6.11	48.9%
e	**Kia**	Spectra	5.62	6.07	48.1%
e	**Scion**	tC	5.96	5.08	54.0%
e	**Suzuki**	Forenza	5.59	7.25	43.5%
e	**Ford**	Focus	5.47	9.52	36.5%
e	**Mazda**	Protégé	5.76	9.38	38.0%
e	**Pontiac**	Sunfire	5.87	6.56	47.2%
e	**Chevrolet**	Cavalier	5.83	5.74	50.4%
e	**Scion**	xA	5.89	7.97	42.5%
e	**Toyota**	Corolla	5.91	6.85	46.3%
e	**Dodge**	Neon	5.68	8.25	40.8%
e	**Hyundai**	Elantra	5.65	7.39	43.3%
e	**Saturn**	Ion	5.62	6.53	46.2%
e	**Ford**	Escort	5.48	9.82	35.8%
e	**Scion**	xB	5.61	9.52	37.1%
		Total Economy Cars	**5.70**	**7.97**	**41.7%**
elsuv	**Nissan**	Xterra	5.90	8.57	40.8%
elsuv	**Isuzu**	Trooper	5.55	9.58	36.7%
elsuv	**Mazda**	Mazda5	5.87	6.97	45.7%
elsuv	**Isuzu**	Rodeo	5.94	7.89	42.9%
elsuv	**Suzuki**	XL-7	5.87	7.40	44.3%
elsuv	**Suzuki**	Grand Vitara	5.56	6.74	45.2%
elsuv	**Kia**	Sorento	5.79	6.14	48.5%
elsuv	**Chevrolet**	Blazer	5.56	9.64	36.6%
elsuv	**Suzuki**	Vitara	5.83	6.19	48.5%
elsuv	**Isuzu**	Rodeo Sport	5.98	7.34	44.9%
elsuv	**Kia**	Sportage	5.65	6.50	46.5%
elsuv	**Jeep**	Liberty	5.58	10.34	35.1%
elsuv	**Chevrolet**	Tracker	5.45	7.57	41.9%
elsuv	**Jeep**	Wrangler	5.75	10.15	36.2%
		Ttl Entry Level SUVs	**5.73**	**7.93**	**42.0%**

elsw	**Mitsubishi**	Outlander	6.01	7.54	44.3%
elsw	**Hyundai**	Tucson	5.84	5.05	53.6%
elsw	**Mazda**	Tribute	5.93	7.37	44.6%
elsw	**Hyundai**	Santa Fe	5.57	6.08	47.8%
elsw	**Pontiac**	Torrent	5.87	6.70	46.7%
elsw	**Ford**	Escape	5.49	6.07	47.5%
elsw	**Mercury**	Mariner	5.70	6.39	47.1%
elsw	**Toyota**	RAV4	5.82	7.60	43.4%
elsw	**Saturn**	Vue	5.47	7.69	41.6%
elsw	**Chevrolet**	Equinox	5.52	9.52	36.7%
elsw	**Honda**	Element	5.61	4.69	54.5%
elsw	**Pontiac**	Aztek	5.93	8.41	41.4%
elsw	**Honda**	CR-V	5.68	7.94	41.7%
		Ttl Entry Level Sportwagons	**5.73**	**7.00**	**45.0%**
fspu	**Nissan**	Titan	5.82	6.05	49.0%
fspu	**Toyota**	Tundra	5.69	9.16	38.3%
fspu	**Dodge**	Ram pickup	5.70	11.46	33.2%
fspu	**Chevrolet**	Silverado	5.95	12.51	32.2%
fspu	**GMC**	Sierra	5.94	11.81	33.5%
fspu	**Ford**	F Series	5.45	15.52	26.0%
		Ttl Full Size Pickup	**5.76**	**11.09**	**34.2%**
fsv	**GMC**	Savana/G Van	5.88	7.05	45.4%
fsv	**Ford**	Econoline/Club Wagon	5.81	6.99	45.4%
fsv	**GMC**	Express/G Van	5.48	7.03	43.8%
fsv	**Dodge**	Sprinter Van	5.82	13.80	29.7%
fsv	**Dodge**	Ram Van	5.77	5.99	49.1%
fsv	**Ford**	Econoline van	5.78	8.96	39.2%
		Full Size Van	**5.75**	**8.30**	**40.9%**
hy	**Honda**	Accord Hybrid	5.53	5.65	49.4%
hy	**Toyota**	Prius	5.60	6.32	47.0%
hy	**Honda**	Civic Hybrid	5.45	4.09	57.1%
hy	**Ford**	Escape Hybrid	5.50	7.05	43.8%
hy	**Mercury**	Mariner Hybrid	5.74	5.82	49.6%
hy	**Honda**	Insight	5.77	7.46	43.6%
hy	**Lexus**	RX 400h	5.73	9.48	37.7%
hy	**Toyota**	Highlander Hybrid	5.69	5.91	49.0%
		Ttl Hybrids	**5.62**	**6.47**	**46.5%**
l	**Volkswagen**	Phaeton	5.55	20.25	21.5%
l	**Audi**	allroad quattro	5.97	14.66	28.9%
l	**Audi**	A6	5.73	8.99	38.9%
l	**Lexus**	LS 430	5.71	12.73	31.0%
l	**Lexus**	GS 430	6.01	9.34	39.1%
l	**Infiniti**	Q45	5.59	9.77	36.4%
l	**Jaguar**	S-Type	5.79	8.07	41.8%
l	**Infiniti**	M45	5.44	5.36	50.4%
l	**Lexus**	GS 300	5.55	4.76	53.8%

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l	**Cadillac**	DTS	6.01	8.52	41.4%
l	**Cadillac**	DeVille	5.49	10.01	35.4%
l	**M-Benz**	E class	5.84	14.01	29.4%
l	**Cadillac**	Seville	5.58	6.72	45.4%
l	**Volvo**	80 series	5.75	10.34	35.7%
l	**Cadillac**	STS	5.63	12.51	31.0%
l	**BMW**	5 Series	5.80	10.53	35.5%
l	**Acura**	RL	5.60	7.44	42.9%
l	**Lincoln**	Town Car	5.69	12.70	30.9%
l	**BMW**	M3	5.54	6.54	45.8%
		Total Luxury Car	**5.70**	**10.17**	**35.9%**
lmr	**Volkswagen**	Golf	5.93	7.66	43.6%
lmr	**Volkswagen**	Golf GTI	5.71	7.54	43.1%
lmr	**Saturn**	L series	5.79	9.15	38.8%
lmr	**Honda**	Civic	5.60	9.83	36.3%
lmr	**Chevrolet**	HHR	5.58	9.03	38.2%
lmr	**Pontiac**	G6	5.92	8.86	40.1%
lmr	**Chevrolet**	Classic	5.86	14.37	29.0%
lmr	**Subaru**	Impreza	6.00	6.21	49.1%
lmr	**Pontiac**	Grand Am	5.49	12.46	30.6%
lmr	**Ford**	Fusion	5.54	10.56	34.4%
lmr	**Mercury**	Milan	6.01	10.56	36.3%
lmr	**Dodge**	Stratus	5.81	11.14	34.3%
lmr	**Kia**	Optima	5.71	9.06	38.7%
lmr	**Hyundai**	Sonata	5.81	7.66	43.1%
lmr	**Suzuki**	Verona	5.92	8.33	41.6%
lmr	**Volkswagen**	Beetle	5.46	9.83	35.7%
lmr	**Pontiac**	Vibe	5.91	8.06	42.3%
lmr	**Chevrolet**	Malibu	5.72	8.14	41.3%
lmr	**Chrysler**	PT Cruiser	5.55	11.89	31.8%
lmr	**Chrysler**	Sebring	5.80	7.88	42.4%
		Ttl Lower Mid-Range Cars	**5.76**	**9.41**	**38.0%**
lmr suv	**Nissan**	Pathfinder	5.73	9.09	38.6%
lmr suv	**Toyota**	4Runner	5.68	9.52	37.4%
lmr suv	**Mitsubishi**	Montero	5.67	8.80	39.2%
lmr suv	**Mitsubishi**	Montero Sport	5.48	7.19	43.2%
lmr suv	**Isuzu**	Axiom	5.99	7.62	44.0%
lmr suv	**Land Rover**	Freelander	5.57	8.43	39.8%
lmr suv	**Isuzu**	Ascender	5.84	8.56	40.6%
lmr suv	**Jeep**	Commander	5.84	12.73	31.5%
lmr suv	**Jeep**	Grand Cherokee	5.88	13.58	30.2%
lmr suv	**Jeep**	Grand Cherokee SRT-8	5.71	10.71	34.8%
lmr suv	**Dodge**	Durango	5.49	11.53	32.3%
lmr suv	**Ford**	Explorer	6.00	13.10	31.4%
lmr suv	**Chevrolet**	TrailBlazer	5.89	10.26	36.5%
		Ttl Lower Mid-Range SUV	**5.75**	**10.09**	**36.3%**
lsuv	**Toyota**	Sequoia	5.51	7.85	41.2%

lsuv	**Nissan**	Armada	6.01	5.96	50.2%
lsuv	**Ford**	Excursion	5.91	12.28	32.5%
lsuv	**Chevrolet**	Suburban	5.58	13.12	29.8%
lsuv	**GMC**	Yukon XL	5.90	15.27	27.9%
lsuv	**Ford**	Expedition	5.59	13.69	29.0%
lsuv	**Chevrolet**	Tahoe	5.90	12.94	31.3%
lsuv	**GMC**	Yukon	5.71	12.59	31.2%
		Total Large SUV	**5.76**	**11.71**	**33.0%**
mrsw	**Chrysler**	Pacifica	5.98	6.65	47.4%
mrsw	**Nissan**	Murano	5.68	7.45	43.3%
mrsw	**Toyota**	Highlander	5.97	6.20	49.1%
mrsw	**Ford**	Freestyle/Windstar	5.89	10.92	35.0%
mrsw	**Buick**	Rendezvous	5.97	7.28	45.1%
mrsw	**Honda**	Pilot	5.82	4.96	54.0%
mrsw	**Mitsubishi**	Endeavor	5.62	6.27	47.3%
		Total Mid-Range Sportwagons	**5.85**	**7.10**	**45.2%**
mv	**Volkswagen**	EuroVan/T4	5.67	7.29	43.7%
mv	**Honda**	Odyssey	5.87	9.39	38.4%
mv	**Pontiac**	Montana SV6	5.55	7.73	41.8%
mv	**Chrysler**	Town & Country	5.52	8.15	40.4%
mv	**Buick**	Terraza	5.60	8.72	39.1%
mv	**Dodge**	Caravan/Grand Caravan	5.78	7.48	43.6%
mv	**Toyota**	Sienna	5.70	7.20	44.2%
mv	**Chevrolet**	Venture	5.75	8.20	41.2%
mv	**Saturn**	Relay	5.90	6.67	46.9%
mv	**Pontiac**	Montana	5.72	8.10	41.4%
mv	**Nissan**	Quest	5.86	6.48	47.5%
mv	**Chevrolet**	Uplander	5.75	7.00	45.1%
mv	**Ford**	Freestar	5.63	7.02	44.5%
mv	**Mercury**	Monterey	5.56	6.58	45.8%
mv	**Kia**	Sedona	5.56	5.62	49.7%
mv	**Mazda**	MPV	5.95	6.48	47.9%
mv	**GMC**	Safari	5.73	10.11	36.2%
mv	**Chevrolet**	Astro	5.72	10.61	35.0%
		Total Minivans	**5.71**	**7.71**	**42.5%**
nl	**Volvo**	70 series	5.54	9.25	37.4%
nl	**Volvo**	60 series	5.75	6.24	48.0%
nl	**Mercury**	Zephyr	5.50	9.13	37.6%
nl	**Acura**	TL	5.65	7.82	41.9%
nl	**Acura**	CL	5.87	8.06	42.1%
nl	**Lincoln**	LS	5.58	6.46	46.4%
nl	**Jaguar**	X-Type	5.53	8.16	40.4%
nl	**Lexus**	ES 330	5.71	8.25	40.9%
nl	**Lexus**	IS 300	5.54	7.57	42.2%
nl	**Infiniti**	G35	5.45	7.62	41.7%
nl	**M-Benz**	C class	5.96	7.48	44.4%
nl	**Cadillac**	CTS	5.90	6.33	48.3%

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nl	**BMW**	330	5.85	8.33	41.3%
nl	**Buick**	Park Avenue	5.64	7.77	42.1%
nl	**BMW**	325	5.75	7.57	43.2%
nl	**Saab**	9-5	5.55	6.50	46.0%
		Total Near Luxury Cars	**5.67**	**7.66**	**42.5%**
p	**Audi**	A8	5.61	13.51	29.4%
p	**M-Benz**	S class	5.93	16.02	27.0%
p	**Maserati**	Maserati	5.46	8.39	39.4%
p	**BMW**	7 Series	5.90	11.54	33.8%
p	**Jaguar**	XJ	5.71	8.18	41.1%
		Total Premium Cars	**5.72**	**11.53**	**33.2%**
pmr	**Mercury**	Montego	5.54	5.81	48.8%
pmr	**Buick**	LaCrosse	5.78	6.33	47.7%
pmr	**Volkswagen**	Passat	5.55	8.75	38.8%
pmr	**Dodge**	Magnum	5.48	9.46	36.7%
pmr	**Ford**	Five Hundred	5.66	6.66	46.0%
pmr	**Dodge**	Charger	5.67	7.52	43.0%
pmr	**Nissan**	Maxima	5.59	9.46	37.1%
pmr	**Chrysler**	300/300M	5.81	8.00	42.1%
pmr	**Mitsubishi**	Diamante	5.95	6.44	48.0%
pmr	**Volvo**	40 series	5.56	7.30	43.2%
pmr	**Infiniti**	I30/I35	5.61	9.92	36.1%
pmr	**Mazda**	Millenia	5.62	4.38	56.2%
pmr	**Audi**	A4/S4	5.80	6.30	47.9%
pmr	**Audi**	S4	5.72	7.04	44.8%
pmr	**Acura**	TSX	5.59	8.03	41.0%
pmr	**Saab**	9-3	6.00	8.36	41.8%
pmr	**Saab**	9-2	5.52	7.09	43.8%
pmr	**Buick**	Regal	5.81	6.62	46.7%
		Total Premium Mid-Range Cars	**5.68**	**7.41**	**43.4%**
ps	**M-Benz**	SLK class	5.54	7.74	41.7%
ps	**M-Benz**	CLS class	5.84	16.08	26.6%
ps	**M-Benz**	CLK class	5.99	10.86	35.5%
ps	**Porsche**	Boxster	5.51	7.74	41.6%
ps	**Chevrolet**	Corvette	5.71	8.14	41.2%
ps	**Audi**	TT	5.74	6.63	46.4%
ps	**BMW**	Z8	5.95	9.46	38.6%
ps	**BMW**	Z4	6.01	7.52	44.4%
ps	**Ford**	Thunderbird	5.50	11.32	32.7%
ps	**Chrysler**	Crossfire	5.59	5.40	50.9%
		Total Premium Sporty Cars	**5.74**	**9.09**	**38.7%**
psuv	**Porsche**	Cayenne	5.65	12.49	31.1%
psuv	**Volkswagen**	Touareg	5.57	13.36	29.4%
psuv	**Land Rover**	Range Rover	5.82	13.37	30.3%
psuv	**M-Benz**	G class	5.89	16.94	25.8%
psuv	**Hummer**	H1	5.64	29.32	16.1%

psuv	**Lexus**	LX 470	5.52	13.99	28.3%
psuv	**Cadillac**	Escalade ESV	5.89	16.93	25.8%
psuv	**Toyota**	Land Cruiser	5.56	22.55	19.8%
psuv	**Hummer**	H2	5.67	12.77	30.7%
psuv	**Cadillac**	Escalade	5.74	17.41	24.8%
psuv	**Lincoln**	Navigator	5.66	12.34	31.4%
		Total Premium SUV	**5.69**	**16.50**	**25.6%**
psw	**Volvo**	XC90	5.63	10.19	35.6%
psw	**Lexus**	RX330	5.82	8.29	41.3%
psw	**Infiniti**	FX35	5.68	6.78	45.6%
psw	**Infiniti**	FX45	5.52	8.36	39.8%
psw	**M-Benz**	R class	6.00	6.54	47.9%
psw	**Volvo**	50 series	5.55	5.76	49.1%
psw	**Acura**	MDX	5.71	9.44	37.7%
psw	**Cadillac**	SRX	5.99	5.50	52.1%
psw	**M-Benz**	M class	5.94	8.45	41.3%
psw	**BMW**	X5	5.45	7.15	43.2%
psw	**BMW**	X3	5.87	6.39	47.9%
		Total Premium Sportwagons	**5.74**	**7.53**	**43.3%**
smr	**Honda**	Accord	5.65	10.50	35.0%
smr	**Volkswagen**	Jetta wagon	5.85	3.92	59.9%
smr	**Volkswagen**	Jetta	5.59	4.48	55.6%
smr	**Toyota**	Camry	5.66	8.99	38.6%
smr	**Subaru**	Baja	5.63	5.75	49.5%
smr	**Subaru**	Legacy	5.85	5.26	52.7%
smr	**Subaru**	Forester	5.57	6.93	44.5%
smr	**Subaru**	Outback	5.85	5.74	50.5%
smr	**Mazda**	Mazda6	5.83	5.89	49.7%
smr	**Dodge**	Intrepid	5.77	6.97	45.3%
smr	**Chevrolet**	Monte Carlo	5.50	8.75	38.6%
smr	**Mitsubishi**	Galant	5.53	5.77	48.9%
smr	**Pontiac**	Grand Prix	5.44	5.87	48.1%
smr	**Buick**	Century	5.49	7.79	41.4%
smr	**Mercury**	Sable	5.53	8.63	39.0%
smr	**Ford**	Taurus	5.75	8.96	39.1%
smr	**Mazda**	626	5.83	6.18	48.5%
smr	**Nissan**	Altima	5.96	4.99	54.4%
smr	**Chevrolet**	Impala	5.55	7.67	42.0%
smr	**Hyundai**	XG350	5.75	5.02	53.4%
smr	**Kia**	Amanti	5.66	6.33	47.2%
		Total Small Rid-Range Cars	**5.68**	**6.69**	**45.9%**
spu	**Chevrolet**	SSR	5.79	5.50	51.3%
spu	**Honda**	Ridgeline	5.65	7.26	43.8%
spu	**GMC**	Canyon	5.89	8.62	40.6%
spu	**GMC**	Sonoma	5.46	9.99	35.3%
spu	**Nissan**	Frontier	5.59	7.61	42.3%
spu	**Toyota**	Tacoma	5.47	7.80	41.2%

spu	**Chevrolet**	Colorado	5.92	9.28	39.0%
spu	**Mitsubishi**	Raider	5.90	8.73	40.3%
spu	**Mazda**	B-Series	5.67	9.28	37.9%
spu	**Dodge**	Dakota	5.77	8.63	40.0%
spu	**Ford**	Ranger	6.01	8.73	40.8%
spu	**Chevrolet**	S10	5.55	7.84	41.4%
		Total Small Pickup	**5.72**	**8.27**	**40.9%**
sup	**Cadillac**	Escalade EXT	5.61	12.83	30.4%
sup	**Chevrolet**	Avalanche	5.47	14.96	26.8%
sup	**Lincoln**	Mark LT	5.60	10.62	34.5%
		Total Specialty Utility Pickup	**5.56**	**12.81**	**30.3%**
t	**Mazda**	RX8	5.52	8.38	39.7%
t	**Nissan**	350Z	5.84	8.70	40.2%
t	**Audi**	A3	5.65	7.22	43.9%
t	**Mitsubishi**	Eclipse Spyder	5.55	5.33	51.0%
t	**Mitsubishi**	Eclipse	5.93	7.60	43.8%
t	**Pontiac**	GTO	5.45	8.27	39.7%
t	**Toyota**	Celica	5.90	7.00	45.7%
t	**Mini**	Mini Cooper S	5.64	9.77	36.6%
t	**Acura**	RSX	5.83	9.45	38.1%
t	**Pontiac**	Solstice	5.50	8.98	38.0%
t	**Mini**	Mini Cooper	5.78	9.68	37.4%
t	**Ford**	Mustang	5.61	11.67	32.5%
t	**Toyota**	MR2 Spyder	5.60	9.35	37.5%
t	**Mazda**	MX-5 Miata	5.53	11.30	32.9%
t	**Honda**	S2000	5.59	9.14	37.9%
t	**Hyundai**	Tiburon	5.45	12.65	30.1%
t	**Pontiac**	Firebird	5.98	11.08	35.1%
t	**Chevrolet**	Camaro	5.52	11.93	31.6%
		Total Touring	**5.66**	**9.31**	**37.8%**
tr	**Toyota**	Avalon	5.82	8.66	40.2%
tr	**Buick**	Lucerne	5.52	6.25	46.9%
tr	**Pontiac**	Bonneville	5.97	6.49	47.9%
tr	**Chrysler**	Concorde	5.92	6.94	46.0%
tr	**Mercury**	Grand Marquis	5.47	8.88	38.1%
tr	**Ford**	Crown Victoria	5.73	9.28	38.2%
tr	**Buick**	LeSabre	5.49	6.95	44.2%
		Total Traditional Car	**5.70**	**7.63**	**42.8%**
u	**Maybach**	Maybach	5.57	17.47	24.2%
u	**Rolls-Royce**	Rolls-Royce	5.46	18.77	22.5%
ul	**Bentley**	Bentley	5.96	18.47	24.4%
ul	**Porsche**	Carrera GT	5.64	10.69	34.5%
ul	**Lamborghini**	Lamborghini	5.51	5.43	50.4%
ul	**Ferrar**	Ferrari	5.89	4.70	55.6%
ul	**Ford**	GT	5.55	4.76	53.9%
ul	**Aston Martin**	Aston Martin	5.94	7.93	42.8%

		Total Ultra Luxury	**5.69**	**11.03**	**34.0%**
umr suv	**Lexus**	GX 470	5.86	6.67	46.7%
umr suv	**Land Rover**	Discovery	5.47	9.24	37.2%
umr suv	**Land Rover**	LR3	5.53	10.83	33.8%
umr suv	**Infiniti**	QX4	5.83	4.74	55.1%
umr suv	**Land Rover**	Range Rover Sport	5.85	9.49	38.2%
umr suv	**Lincoln**	Aviator	5.60	7.67	42.2%
umr suv	**Mercury**	Mountaineer	5.47	6.81	44.5%
umr suv	**Subaru**	B9 Tribeca	5.97	4.45	57.3%
umr suv	**GMC**	Envoy	6.01	8.31	41.9%
umr suv	**Buick**	Rainier	5.49	7.10	43.6%
umr suv	**Saab**	9-7X	5.92	4.89	54.7%
umr suv	**Hummer**	H3	5.65	9.64	36.9%
		Total Upper Mid-Range SUV	**5.72**	**7.49**	**43.3%**
ups	**Acura**	NSX	5.74	12.96	30.7%
ups	**M-Benz**	SC 430	5.85	9.70	37.6%
ups	**Cadillac**	XLR	5.93	10.13	36.9%
ups	**Jaguar**	XK	5.76	11.54	33.3%
ups	**Porsche**	911 Carrera 4	5.94	7.33	44.7%
ups	**Porsche**	911 Carrera	5.67	9.94	36.3%
ups	**M-Benz**	SL Coupe/Roadster	6.00	9.16	39.6%
ups	**M-Benz**	CL class	5.84	13.71	29.9%
ups	**BMW**	6 Series	5.76	10.06	36.4%
ups	**Lotus**	Lotus	5.83	5.67	50.7%
ups	**Dodge**	Viper	5.74	4.69	55.0%
		Total Upper Premium Sportscars	**5.82**	**9.54**	**37.9%**
		Industry Average Adjusted	**6.16**	**9.50**	**39.3%**

What's interesting about the U.S. market is that consumers tend to keep a vehicle within the household for approximately the same length of time regardless of the original cost of that vehicle or its market segment. All of the segments fall in the 5.0 to 5.9 range.

What varies is how the car or truck is treated within the household fleet. How long it is used as a primary vehicle vs. being relegated to occasional duty for specific purposes.

Luxury vehicles, for example, continue to be a primary vehicle for much of the first-owner's possession while budget and economy cars are frequently passed down within three years.

To get a handle on that issue and to equate the energy costs over the lifetime of individual models, we looked at historic and cy2005 as well as projections for the expected share of travel devoted to short, medium and long mileage trips.

Segment	Division	Model	1-7 miles Short Trips	8-30 miles Medium Trips	31+ miles Long Trips
b	**Kia**	Rio	51.81%	33.05%	15.14%
b	**Hyundai**	Accent	53.02%	33.68%	13.30%
b	**Chevrolet**	Aveo	53.45%	34.03%	12.52%
b	**Toyota**	Echo	53.81%	31.92%	14.27%
		Total Budget Cars	**53.02%**	**33.17%**	**13.81%**
e	**Chevrolet**	Cobalt	47.28%	28.56%	24.16%
e	**Toyota**	Matrix **	45.90%	28.40%	25.70%
e	**Mazda**	Mazda3	45.76%	29.35%	24.89%
e	**Nissan**	Sentra	44.52%	27.40%	28.08%
e	**Suzuki**	Aerio	45.63%	29.97%	24.40%
e	**Mitsubishi**	Lancer	44.65%	27.83%	27.52%
e	**Kia**	Spectra	44.07%	30.89%	25.04%
e	**Scion**	tC	47.20%	30.05%	22.75%
e	**Suzuki**	Forenza	44.52%	27.64%	27.84%
e	**Ford**	Focus	43.66%	30.04%	26.30%
e	**Mazda**	Protégé	47.81%	28.73%	23.46%
e	**Pontiac**	Sunfire	46.13%	29.78%	24.09%
e	**Chevrolet**	Cavalier	45.48%	27.85%	26.67%
e	**Scion**	xA	46.20%	30.86%	22.94%
e	**Toyota**	Corolla	47.11%	30.41%	22.48%
e	**Dodge**	Neon	43.64%	29.30%	27.06%
e	**Hyundai**	Elantra	46.78%	30.54%	22.68%
e	**Saturn**	Ion	44.73%	30.39%	24.88%
e	**Ford**	Escort	47.73%	27.42%	24.85%
e	**Scion**	xB	47.81%	30.31%	21.88%
		Total Economy Cars	**45.83%**	**29.29%**	**24.88%**
elsuv	**Nissan**	Xterra	51.16%	29.97%	18.87%
elsuv	**Isuzu**	Trooper	52.96%	31.21%	15.83%
elsuv	**Mazda**	Mazda5	53.92%	32.37%	13.71%

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elsuv	**Isuzu**	Rodeo	50.20%	30.50%	19.30%
elsuv	**Suzuki**	XL-7	50.08%	31.07%	18.85%
elsuv	**Suzuki**	Grand Vitara	52.05%	33.32%	14.63%
elsuv	**Kia**	Sorento	50.54%	30.97%	18.49%
elsuv	**Chevrolet**	Blazer	50.54%	33.94%	15.52%
elsuv	**Suzuki**	Vitara	49.36%	29.98%	20.66%
elsuv	**Isuzu**	Rodeo Sport	51.98%	33.68%	14.34%
elsuv	**Kia**	Sportage	52.14%	34.11%	13.75%
elsuv	**Jeep**	Liberty	53.33%	34.90%	11.77%
elsuv	**Chevrolet**	Tracker	52.47%	29.90%	17.63%
elsuv	**Jeep**	Wrangler	51.01%	31.95%	17.04%
		Ttl Entry Level SUVs	**51.55%**	**31.99%**	**16.46%**
elsw	**Mitsubishi**	Outlander	46.27%	34.58%	19.15%
elsw	**Hyundai**	Tucson	48.25%	33.85%	17.90%
elsw	**Mazda**	Tribute	49.21%	32.14%	18.65%
elsw	**Hyundai**	Santa Fe	49.19%	31.16%	19.65%
elsw	**Pontiac**	Torrent	47.26%	30.39%	22.35%
elsw	**Ford**	Escape	48.11%	31.09%	20.80%
elsw	**Mercury**	Mariner	45.11%	34.38%	20.51%
elsw	**Toyota**	RAV4	47.09%	30.46%	22.45%
elsw	**Saturn**	Vue	46.27%	33.51%	20.22%
elsw	**Chevrolet**	Equinox	47.91%	32.75%	19.34%
elsw	**Honda**	Element	49.44%	31.14%	19.42%
elsw	**Pontiac**	Aztek	48.15%	34.72%	17.13%
elsw	**Honda**	CR-V	46.57%	33.66%	19.77%
		Ttl Entry Level Sportwagons	**47.60%**	**32.60%**	**19.80%**
fspu	**Nissan**	Titan	55.30%	26.17%	18.53%
fspu	**Toyota**	Tundra	53.96%	30.80%	15.24%
fspu	**Dodge**	Ram pickup	53.88%	26.19%	19.93%
fspu	**Chevrolet**	Silverado	54.03%	24.39%	21.58%
fspu	**GMC**	Sierra	54.42%	29.31%	16.27%
fspu	**Ford**	F Series	54.26%	27.72%	18.02%
		Ttl Full Size Pickup	**54.31%**	**27.43%**	**18.26%**
fsv	**GMC**	Savana/G Van	62.35%	29.33%	8.32%
fsv	**Ford**	Econoline/Club Wagon	61.19%	28.29%	10.52%
fsv	**GMC**	Express/G Van	62.06%	27.51%	10.43%
fsv	**Dodge**	Sprinter Van	61.74%	29.52%	8.74%
fsv	**Dodge**	Ram Van	60.11%	27.77%	12.12%
fsv	**Ford**	Econoline van	61.02%	28.61%	10.37%
		Full Size Van	**61.41%**	**28.51%**	**10.08%**
hy	**Honda**	Accord Hybrid	59.03%	30.19%	10.78%
hy	**Toyota**	Prius	63.45%	32.36%	4.19%
hy	**Honda**	Civic Hybrid	54.19%	27.29%	18.52%
hy	**Ford**	Escape Hybrid	55.72%	29.41%	14.87%
hy	**Mercury**	Mariner Hybrid	56.18%	28.62%	15.20%
hy	**Honda**	Insight	73.46%	21.12%	5.42%

hy	**Lexus**	RX 400h	51.36%	26.91%	21.73%
hy	**Toyota**	Highlander Hybrid	55.37%	28.93%	15.70%
		Ttl Hybrids	**58.60%**	**28.10%**	**13.30%**
l	**Volkswagen**	Phaeton	34.46%	39.24%	26.30%
l	**Audi**	allroad quattro	38.74%	32.20%	29.06%
l	**Audi**	A6	39.72%	29.45%	30.83%
l	**Lexus**	LS 430	39.69%	31.21%	29.10%
l	**Lexus**	GS 430	39.34%	31.28%	29.38%
l	**Infiniti**	Q45	38.07%	30.61%	31.32%
l	**Jaguar**	S-Type	40.09%	29.96%	29.95%
l	**Infiniti**	M45	38.69%	29.73%	31.58%
l	**Lexus**	GS 300	39.02%	32.54%	28.44%
l	**Cadillac**	DTS	39.31%	31.56%	29.13%
l	**Cadillac**	DeVille	40.24%	32.40%	27.36%
l	**M-Benz**	E class	37.38%	31.96%	30.66%
l	**Cadillac**	Seville	39.27%	32.92%	27.81%
l	**Volvo**	80 series	37.70%	32.58%	29.72%
l	**Cadillac**	STS	37.34%	31.18%	31.48%
l	**BMW**	5 Series	40.20%	31.17%	28.63%
l	**Acura**	RL	38.68%	31.47%	29.85%
l	**Lincoln**	Town Car	39.25%	30.45%	30.30%
l	**BMW**	M3	39.67%	30.05%	30.28%
		Total Luxury Car	**38.78%**	**31.68%**	**29.54%**
lmr	**Volkswagen**	Golf	43.55%	31.87%	24.58%
lmr	**Volkswagen**	Golf GTI	44.16%	31.96%	23.88%
lmr	**Saturn**	L series	43.24%	33.50%	23.26%
lmr	**Honda**	Civic	45.18%	32.09%	22.73%
lmr	**Chevrolet**	HHR	40.16%	42.76%	17.08%
lmr	**Pontiac**	G6	45.11%	31.66%	23.23%
lmr	**Chevrolet**	Classic	41.91%	33.71%	24.38%
lmr	**Subaru**	Impreza	44.17%	31.04%	24.79%
lmr	**Pontiac**	Grand Am	43.27%	34.41%	22.32%
lmr	**Ford**	Fusion	43.61%	31.97%	24.42%
lmr	**Mercury**	Milan	43.44%	31.65%	24.91%
lmr	**Dodge**	Stratus	41.52%	34.31%	24.17%
lmr	**Kia**	Optima	41.73%	33.97%	24.30%
lmr	**Hyundai**	Sonata	43.27%	31.03%	25.70%
lmr	**Suzuki**	Verona	43.02%	30.86%	26.12%
lmr	**Volkswagen**	Beetle	45.15%	33.20%	21.65%
lmr	**Pontiac**	Vibe	44.71%	31.20%	24.09%
lmr	**Chevrolet**	Malibu	44.82%	30.43%	24.75%
lmr	**Chrysler**	PT Cruiser	43.05%	30.81%	26.14%
lmr	**Chrysler**	Sebring	44.17%	34.84%	20.99%
		Ttl Lower Mid-Range Cars	**43.46%**	**32.86%**	**23.67%**
lmr suv	**Nissan**	Pathfinder	34.08%	36.71%	29.21%
lmr suv	**Toyota**	4Runner	32.23%	35.46%	32.31%
lmr suv	**Mitsubishi**	Montero	32.05%	36.62%	31.33%

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lmr suv	**Mitsubishi**	Montero Sport	35.34%	36.44%	28.22%
lmr suv	**Isuzu**	Axiom	32.22%	38.07%	29.71%
lmr suv	**Land Rover**	Freelander	33.22%	38.84%	27.94%
lmr suv	**Isuzu**	Ascender	33.33%	35.56%	31.11%
lmr suv	**Jeep**	Commander	35.10%	37.08%	27.82%
lmr suv	**Jeep**	Grand Cherokee	33.18%	36.19%	30.63%
lmr suv	**Jeep**	Grand Cherokee SRT-8	32.18%	36.42%	31.40%
lmr suv	**Dodge**	Durango	33.20%	38.62%	28.18%
lmr suv	**Ford**	Explorer	31.48%	38.54%	29.98%
lmr suv	**Chevrolet**	TrailBlazer	34.29%	37.23%	28.48%
		Ttl Lower Mid-Range SUV	**33.22%**	**37.06%**	**29.72%**
lsuv	**Toyota**	Sequoia	35.02%	37.24%	27.74%
lsuv	**Nissan**	Armada	35.64%	37.62%	26.74%
lsuv	**Ford**	Excursion	34.36%	36.79%	28.85%
lsuv	**Chevrolet**	Suburban	37.72%	38.44%	23.84%
lsuv	**GMC**	Yukon XL	34.35%	39.48%	26.17%
lsuv	**Ford**	Expedition	35.74%	39.40%	24.86%
lsuv	**Chevrolet**	Tahoe	38.47%	37.79%	23.74%
lsuv	**GMC**	Yukon	35.63%	36.76%	27.61%
		Total Large SUV	**35.87%**	**37.94%**	**26.19%**
mrsw	**Chrysler**	Pacifica	32.10%	37.12%	30.78%
mrsw	**Nissan**	Murano	33.85%	34.48%	31.67%
mrsw	**Toyota**	Highlander	34.38%	36.94%	28.68%
mrsw	**Ford**	Freestyle/Windstar	33.16%	37.15%	29.69%
mrsw	**Buick**	Rendezvous	33.88%	35.90%	30.22%
mrsw	**Honda**	Pilot	33.33%	38.26%	28.41%
mrsw	**Mitsubishi**	Endeavor	31.43%	35.00%	33.57%
		Total Mid-Range Sportwagons	**33.16%**	**36.41%**	**30.43%**
mv	**Volkswagen**	EuroVan/T4	38.61%	32.85%	28.54%
mv	**Honda**	Odyssey	37.70%	33.56%	28.74%
mv	**Pontiac**	Montana SV6	37.80%	35.19%	27.01%
mv	**Chrysler**	Town & Country	39.33%	35.11%	25.56%
mv	**Buick**	Terraza	39.59%	33.52%	26.89%
mv	**Dodge**	Caravan/Grand Caravan	37.47%	34.93%	27.60%
mv	**Toyota**	Sienna	38.11%	35.25%	26.64%
mv	**Chevrolet**	Venture	40.20%	33.56%	26.24%
mv	**Saturn**	Relay	37.65%	35.16%	27.19%
mv	**Pontiac**	Montana	37.57%	33.92%	28.51%
mv	**Nissan**	Quest	37.58%	34.84%	27.58%
mv	**Chevrolet**	Uplander	38.55%	34.22%	27.23%
mv	**Ford**	Freestar	37.51%	35.65%	26.84%
mv	**Mercury**	Monterey	40.16%	34.45%	25.39%
mv	**Kia**	Sedona	37.92%	34.88%	27.20%
mv	**Mazda**	MPV	38.42%	35.04%	26.54%
mv	**GMC**	Safari	37.69%	33.82%	28.49%
mv	**Chevrolet**	Astro	38.32%	32.63%	29.05%
		Total Minivans	**38.34%**	**34.37%**	**27.29%**

nl	**Volvo**	70 series	33.23%	35.38%	31.39%
nl	**Volvo**	60 series	34.08%	33.38%	32.54%
nl	**Mercury**	Zephyr	35.02%	36.58%	28.40%
nl	**Acura**	TL	32.86%	34.98%	32.16%
nl	**Acura**	CL	33.46%	33.47%	33.07%
nl	**Lincoln**	LS	34.10%	34.53%	31.37%
nl	**Jaguar**	X-Type	33.41%	33.74%	32.85%
nl	**Lexus**	ES 330	32.44%	33.77%	33.79%
nl	**Lexus**	IS 300	35.04%	36.40%	28.56%
nl	**Infiniti**	G35	35.37%	35.38%	29.25%
nl	**M-Benz**	C class	34.11%	34.77%	31.12%
nl	**Cadillac**	CTS	35.47%	33.56%	30.97%
nl	**BMW**	330	34.93%	35.31%	29.76%
nl	**Buick**	Park Avenue	32.35%	33.99%	33.66%
nl	**BMW**	325	32.84%	34.38%	32.78%
nl	**Saab**	9-5	34.66%	34.19%	31.15%
		Total Near Luxury Cars	**33.96%**	**34.61%**	**31.43%**
p	**Audi**	A8	30.39%	39.03%	30.58%
p	**M-Benz**	S class	27.46%	39.34%	33.20%
p	**Maserati**	Maserati	29.68%	44.68%	25.64%
p	**BMW**	7 Series	30.47%	39.59%	29.94%
p	**Jaguar**	XJ	27.25%	38.39%	34.36%
		Total Premium Cars	**29.05%**	**40.21%**	**30.74%**
pmr	**Mercury**	Montego	28.01%	40.82%	31.17%
pmr	**Buick**	LaCrosse	26.20%	40.72%	33.08%
pmr	**Volkswagen**	Passat	25.56%	42.49%	31.95%
pmr	**Dodge**	Magnum	28.02%	43.95%	28.03%
pmr	**Ford**	Five Hundred	26.43%	40.35%	33.22%
pmr	**Dodge**	Charger	24.86%	40.95%	34.19%
pmr	**Nissan**	Maxima	25.81%	42.28%	31.91%
pmr	**Chrysler**	300/300M	27.70%	43.16%	29.14%
pmr	**Mitsubishi**	Diamante	26.28%	43.15%	30.57%
pmr	**Volvo**	40 series	27.68%	42.73%	29.59%
pmr	**Infiniti**	I30/I35	24.02%	41.62%	34.36%
pmr	**Mazda**	Millenia	28.57%	44.02%	27.41%
pmr	**Audi**	A4/S4	24.99%	42.56%	32.45%
pmr	**Audi**	S4	26.24%	44.71%	29.05%
pmr	**Acura**	TSX	26.19%	40.77%	33.04%
pmr	**Saab**	9-3	23.49%	40.52%	35.99%
pmr	**Saab**	9-2	24.96%	43.16%	31.88%
pmr	**Buick**	Regal	27.30%	42.97%	29.73%
		Total Premium Mid-Range Cars	**26.24%**	**42.27%**	**31.49%**
ps	**M-Benz**	SLK class	38.42%	41.09%	20.49%
ps	**M-Benz**	CLS class	37.82%	44.68%	17.50%
ps	**M-Benz**	CLK class	40.92%	43.77%	15.31%
ps	**Porsche**	Boxster	39.29%	41.99%	18.72%

ps	**Chevrolet**	Corvette	37.75%	42.46%	19.79%
ps	**Audi**	TT	36.68%	42.00%	21.32%
ps	**BMW**	Z8	38.60%	43.30%	18.10%
ps	**BMW**	Z4	40.33%	40.86%	18.81%
ps	**Ford**	Thunderbird	41.15%	44.46%	14.39%
ps	**Chrysler**	Crossfire	41.30%	43.78%	14.92%
		Total Premium Sporty Cars	**39.23%**	**42.84%**	**17.94%**
psuv	**Porsche**	Cayenne	34.36%	46.94%	18.70%
psuv	**Volkswagen**	Touareg	32.44%	47.53%	20.03%
psuv	**Land Rover**	Range Rover	32.48%	46.30%	21.22%
psuv	**M-Benz**	G class	35.92%	45.61%	18.47%
psuv	**Hummer**	H1	32.75%	46.59%	20.66%
psuv	**Lexus**	LX 470	36.04%	45.76%	18.20%
psuv	**Cadillac**	Escalade ESV	33.09%	48.60%	18.31%
psuv	**Toyota**	Land Cruiser	33.59%	49.23%	17.18%
psuv	**Hummer**	H2	32.47%	46.34%	21.19%
psuv	**Cadillac**	Escalade	34.88%	46.88%	18.24%
psuv	**Lincoln**	Navigator	34.19%	49.31%	16.50%
		Total Premium SUV	**33.84%**	**47.19%**	**18.97%**
psw	**Volvo**	XC90	32.46%	42.32%	25.22%
psw	**Lexus**	RX330	33.42%	42.96%	23.62%
psw	**Infiniti**	FX35	30.68%	41.36%	27.96%
psw	**Infiniti**	FX45	32.61%	43.32%	24.07%
psw	**M-Benz**	R class	32.47%	44.51%	23.02%
psw	**Volvo**	50 series	30.62%	44.36%	25.02%
psw	**Acura**	MDX	33.00%	42.44%	24.56%
psw	**Cadillac**	SRX	31.53%	42.93%	25.54%
psw	**M-Benz**	M class	30.50%	43.91%	25.59%
psw	**BMW**	X5	33.56%	43.95%	22.49%
psw	**BMW**	X3	31.96%	43.88%	24.16%
		Total Premium Sportwagons	**32.07%**	**43.27%**	**24.66%**
smr	**Honda**	Accord	37.61%	42.22%	20.17%
smr	**Volkswagen**	Jetta wagon	37.07%	43.71%	19.22%
smr	**Volkswagen**	Jetta	35.60%	43.85%	20.55%
smr	**Toyota**	Camry	34.92%	40.40%	24.68%
smr	**Subaru**	Baja	37.64%	40.67%	21.69%
smr	**Subaru**	Legacy	36.56%	43.83%	19.61%
smr	**Subaru**	Forester	36.84%	42.06%	21.10%
smr	**Subaru**	Outback	34.67%	41.50%	23.83%
smr	**Mazda**	Mazda6	34.42%	43.19%	22.39%
smr	**Dodge**	Intrepid	38.13%	43.12%	18.75%
smr	**Chevrolet**	Monte Carlo	38.01%	43.42%	18.57%
smr	**Mitsubishi**	Galant	36.81%	43.35%	19.84%
smr	**Pontiac**	Grand Prix	36.34%	43.24%	20.42%
smr	**Buick**	Century	37.65%	42.54%	19.81%
smr	**Mercury**	Sable	34.89%	43.91%	21.20%
smr	**Ford**	Taurus	36.46%	41.10%	22.44%

smr	**Mazda**	626	36.43%	43.48%	20.09%
smr	**Nissan**	Altima	37.21%	41.37%	21.42%
smr	**Chevrolet**	Impala	36.82%	42.73%	20.45%
smr	**Hyundai**	XG350	35.38%	41.67%	22.95%
smr	**Kia**	Amanti	34.67%	41.72%	23.61%
		Total Small Rid-Range Cars	**36.39%**	**42.53%**	**21.09%**
spu	**Chevrolet**	SSR	28.44%	60.09%	11.47%
spu	**Honda**	Ridgeline	38.50%	42.61%	18.89%
spu	**GMC**	Canyon	37.34%	42.42%	20.24%
spu	**GMC**	Sonoma	39.09%	42.27%	18.64%
spu	**Nissan**	Frontier	41.10%	43.36%	15.54%
spu	**Toyota**	Tacoma	39.47%	43.89%	16.64%
spu	**Chevrolet**	Colorado	37.45%	41.73%	20.82%
spu	**Mitsubishi**	Raider	41.60%	43.49%	14.91%
spu	**Mazda**	B-Series	40.63%	42.17%	17.20%
spu	**Dodge**	Dakota	42.10%	42.13%	15.77%
spu	**Ford**	Ranger	40.92%	42.94%	16.14%
spu	**Chevrolet**	S10	42.18%	43.92%	13.90%
		Total Small Pickup	**39.07%**	**44.25%**	**16.68%**
sup	**Cadillac**	Escalade EXT	20.23%	57.45%	22.32%
sup	**Chevrolet**	Avalanche	19.08%	58.55%	22.37%
sup	**Lincoln**	Mark LT	20.73%	57.07%	22.20%
		Total Specialty Utility Pickup	**20.01%**	**57.69%**	**22.30%**
t	**Mazda**	RX8	24.57%	58.81%	16.62%
t	**Nissan**	350Z	20.74%	60.11%	19.15%
t	**Audi**	A3	23.53%	59.57%	16.90%
t	**Mitsubishi**	Eclipse Spyder	24.31%	58.55%	17.14%
t	**Mitsubishi**	Eclipse	21.27%	57.96%	20.77%
t	**Pontiac**	GTO	20.43%	58.60%	20.97%
t	**Toyota**	Celica	24.15%	57.73%	18.12%
t	**Mini**	Mini Cooper S	22.53%	61.59%	15.88%
t	**Acura**	RSX	22.13%	60.21%	17.66%
t	**Pontiac**	Solstice	21.27%	61.74%	16.99%
t	**Mini**	Mini Cooper	21.18%	59.55%	19.27%
t	**Ford**	Mustang	24.18%	62.58%	13.24%
t	**Toyota**	MR2 Spyder	23.53%	57.94%	18.53%
t	**Mazda**	MX-5 Miata	22.23%	58.03%	19.74%
t	**Honda**	S2000	23.45%	62.77%	13.78%
t	**Hyundai**	Tiburon	21.77%	60.83%	17.40%
t	**Pontiac**	Firebird	20.73%	60.36%	18.91%
t	**Chevrolet**	Camaro	20.34%	59.74%	19.92%
		Total Touring	**22.35%**	**59.82%**	**17.83%**
tr	**Toyota**	Avalon	32.29%	52.88%	14.83%
tr	**Buick**	Lucerne	31.54%	50.77%	17.69%
tr	**Pontiac**	Bonneville	31.67%	51.84%	16.49%
tr	**Chrysler**	Concorde	34.14%	52.77%	13.09%

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tr	**Mercury**	Grand Marquis	33.68%	52.57%	13.75%
tr	**Ford**	Crown Victoria	33.75%	48.88%	17.37%
tr	**Buick**	LeSabre	32.59%	50.34%	17.07%
		Total Traditional Car	**32.81%**	**51.44%**	**15.76%**
u	**Maybach**	Maybach	14.58%	68.64%	16.78%
u	**Rolls-Royce**	Rolls-Royce	13.81%	71.01%	15.18%
ul	**Bentley**	Bentley	12.73%	68.98%	18.29%
ul	**Porsche**	Carrera GT	15.46%	70.99%	13.55%
ul	**Lamborghini**	Lamborghini	15.47%	70.63%	13.90%
ul	**Ferrari**	Ferrari	14.02%	73.88%	12.10%
ul	**Ford**	GT	11.20%	69.24%	19.56%
ul	**Aston Martin**	Aston Martin	10.83%	67.62%	21.55%
		Total Ultra Luxury	**13.51%**	**70.12%**	**16.36%**
umr suv	**Lexus**	GX 470	22.86%	51.56%	25.58%
umr suv	**Land Rover**	Discovery	21.62%	48.61%	29.77%
umr suv	**Land Rover**	LR3	23.44%	51.64%	24.92%
umr suv	**Infiniti**	QX4	24.84%	49.77%	25.39%
umr suv	**Land Rover**	Range Rover Sport	20.32%	53.10%	26.58%
umr suv	**Lincoln**	Aviator	22.49%	53.47%	24.04%
umr suv	**Mercury**	Mountaineer	23.49%	52.45%	24.06%
umr suv	**Subaru**	B9 Tribeca	23.77%	53.58%	22.65%
umr suv	**GMC**	Envoy	25.09%	48.82%	26.09%
umr suv	**Buick**	Rainier	22.13%	51.65%	26.22%
umr suv	**Saab**	9-7X	21.57%	49.22%	29.21%
umr suv	**Hummer**	H3	20.54%	51.32%	28.14%
		Total Upper Mid-Range SUV	**22.68%**	**51.27%**	**26.05%**
ups	**Acura**	NSX	14.47%	82.62%	2.91%
ups	**M-Benz**	SC 430	15.47%	82.69%	1.84%
ups	**Cadillac**	XLR	10.68%	83.44%	5.88%
ups	**Jaguar**	XK	12.75%	78.18%	9.07%
ups	**Porsche**	911 Carrera 4	13.38%	82.45%	4.17%
ups	**Porsche**	911 Carrera	12.76%	81.68%	5.56%
ups	**M-Benz**	SL Coupe/Roadster	10.95%	82.64%	6.41%
ups	**M-Benz**	CL class	11.14%	83.31%	5.55%
ups	**BMW**	6 Series	13.17%	81.97%	4.86%
ups	**Lotus**	Lotus	13.02%	77.95%	9.03%
ups	**Dodge**	Viper	14.34%	82.96%	2.70%
		Total Upper Premium Sportscars	**12.92%**	**81.81%**	**5.27%**
		Industry Straight Average	**39.32%**	**44.27%**	**24.22%**

In general, the vast majority of travel on an industry-wide basis is for trips of fewer than 30 miles with those from one to seven miles representing nearly 40 percent. As we'll see, this plays into the energy story over time because fuel economy deteriorates as a vehicle ages and the necessary support industries – tire repair/replacement, as an example – flourish.

We should step back for a second and look at those attributes considered important by new-vehicle shoppers. All of the current conversation is on fuel economy, but is that really as important to consumers as the headlines might suggest?

Each month, CNW measures the vehicle attributes considered "extremely" or "very" important to those folks who are planning to make a car or truck purchase within six months. We've only included three years and the first quarter of 2006, but the trend is clear.

Fuel economy was significantly less of a concern in 1995 and 2000 than it became in 2005 and the first quarter of 2006. A decade ago, barely a quarter of new-vehicle shoppers said gas mileage was important in their purchase decision. In the first quarter of this year, it represented a significant vehicle attribute for better than 60 percent of new-car shoppers.

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Attributes	cy1995 Average	cy2000 Average	cy2005 Average	Q1 '06 Average	% Change cy 05 v 04	% Chng Q1 06 vs cy05
Overall exterior styling	88.4%	88.1%	92.7%	93.2%	1.3%	0.53%
Overall Quality	90.4%	90.4%	92.5%	93.0%	-1.2%	0.63%
Visibility	95.5%	95.2%	92.2%	92.5%	-0.6%	0.27%
Overall status the vehicle projects	74.5%	79.3%	89.4%	91.2%	8.7%	2.09%
Low monthly payments	85.2%	81.6%	91.7%	90.4%	1.6%	-1.38%
Low price compared to competition	78.9%	74.3%	89.5%	88.8%	8.0%	-0.76%
Manufacturer's reputation	81.1%	88.6%	87.5%	87.3%	-5.7%	-0.17%
Ergonomics (driver)	83.7%	86.1%	85.2%	86.3%	-1.2%	1.35%
Passenger protection	68.8%	75.2%	82.7%	83.7%	3.2%	1.19%
Air bags -- front	77.9%	81.9%	81.2%	81.4%	1.0%	0.17%
Seating capacity	86.5%	87.3%	80.2%	81.3%	-3.8%	1.33%
Low sticker price or MSRP	79.5%	73.4%	81.1%	80.5%	10.0%	-0.72%
Sound system	54.9%	52.4%	72.3%	74.6%	15.7%	3.24%
Interior conveniences (e.g. cupholders)	58.8%	63.5%	71.4%	72.6%	4.0%	1.57%
Ergonomics (passenger)	63.9%	73.4%	68.2%	68.3%	-6.3%	0.19%
Low APR	43.1%	47.0%	67.2%	67.4%	-8.4%	0.22%
Overall comfort and convenience	36.4%	39.6%	63.9%	64.2%	13.7%	0.45%
Overall fuel economy	27.2%	22.2%	61.3%	63.9%	60.4%	4.31%
Simplicity of or usefulness of controls	55.6%	56.1%	58.3%	59.9%	2.8%	2.73%
Cupholders	32.4%	50.2%	57.6%	58.3%	2.3%	1.20%
Overall interior appearance	36.9%	46.9%	56.5%	57.3%	1.9%	1.41%
Overall safety	37.3%	42.9%	55.8%	56.2%	4.2%	0.72%
Luggage capacity	55.4%	56.1%	57.5%	55.9%	-3.8%	-2.82%
Anti-lock brakes	NA	56.1%	56.3%	54.2%	-1.9%	-3.73%
Low downpayment	37.1%	34.8%	50.1%	51.5%	0.1%	2.67%
Handling and Performance	41.9%	41.5%	47.6%	49.6%	14.4%	4.14%
Cast alloy or special wheels	22.2%	28.1%	46.8%	48.2%	21.9%	2.97%
Engine design	35.5%	35.8%	46.4%	47.6%	27.9%	2.54%
Extended warranty	36.3%	34.8%	44.4%	44.3%	7.3%	-0.29%
Air bags -- side	NA	NA	41.3%	43.9%	25.4%	6.42%
Tilt steering wheel	29.4%	39.4%	41.1%	41.1%	2.2%	0.17%
Power seats	26.4%	32.1%	39.6%	40.6%	10.5%	2.58%
Higher Horsepower	42.5%	37.6%	35.8%	37.4%	-6.4%	4.56%
Sport or handling suspension	23.4%	25.3%	34.3%	35.3%	19.4%	2.92%
Rural reception of audio (radio)	25.1%	23.7%	32.2%	34.2%	25.4%	6.17%
Disc Brakes	35.5%	38.0%	34.1%	34.1%	4.4%	-0.06%
Remote outside mirror	26.8%	36.4%	31.7%	31.7%	3.8%	0.06%
Child-seat attachments	NA	23.6%	29.9%	30.5%	12.3%	2.14%
enviornmental design/engineering	2.2%	7.2%	24.5%	26.4%	60.9%	7.73%
Low cargo-loading height	30.9%	29.4%	25.2%	25.3%	-0.6%	0.20%
Leather seating	30.7%	14.8%	22.8%	24.7%	17.1%	8.01%
Entertainment Center	NA	9.6%	22.3%	24.4%	30.2%	9.52%
Clear coat exterior paint	21.2%	30.7%	24.1%	24.0%	-3.1%	-0.50%
Four or all-wheel-drive	16.2%	23.6%	23.7%	23.9%	-6.4%	0.84%
Adjustable pedals	NA	10.6%	24.7%	23.8%	11.0%	-3.41%

Remote door locks	18.3%	18.6%	21.5%	21.9%	14.8%	2.10%
Sunroof/moonroof	8.2%	12.1%	21.1%	21.4%	12.3%	1.14%
Roadside Assistance insurance	10.2%	14.4%	18.2%	18.4%	8.1%	1.43%
Stain-resistant seating surfaces	14.1%	12.8%	14.7%	14.7%	5.6%	0.20%
Chrome exterior trim/accents	14.4%	15.9%	11.9%	13.8%	-4.7%	15.95%
Trailer towing capabilities	10.4%	10.8%	11.9%	11.7%	1.4%	-1.18%
Cellular phone / On Star or Similar**	18.7%	10.7%	8.3%	10.4%	97.4%	24.97%
Hybrid gas-electric powerplant	NA	NA	7.6%	8.7%	77.4%	13.50%
Spoiler	6.8%	6.4%	4.9%	4.3%	-14.7%	-12.14%
Wood or woodlike trim (interior)	14.7%	8.0%	5.1%	4.2%	-8.8%	-17.22%
Body cladding	16.1%	9.5%	1.9%	1.6%	-51.5%	-17.99%

Simultaneously, having more horsepower is less important today than in 1995.

But more power is hardly insignificant with a higher percentage of shoppers saying it is more critical than entertainment centers or “environmental design or engineering.”

The point is this: Because vehicles are now part of a household fleet rather than a family’s all-purpose and sole transportation, specific models can have specific purposes requiring specific content. A commuter car doesn’t necessarily have to lug the family’s pontoon boat to the lake because there is a new or used SUV or pickup in the garage to perform that duty.

CHAPTER THREE – The Fuel Economy Component

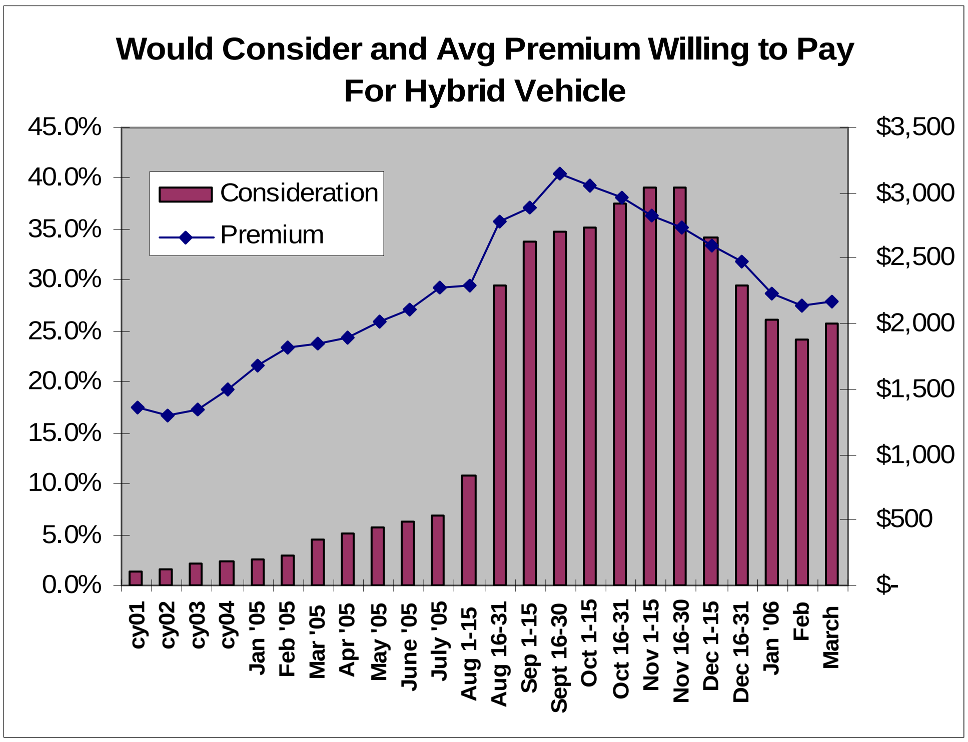
Much of the focus of energy usage, dependence on fossil fuels and emissions revolves around discussions of fuel economy. And while this is not the largest component in the overall "Dust to Dust" analysis, it deserves central mention simply **because it is the most visible area to the public.**

When the attributes table is looked at in terms of First Quarter '06 vs. '05 growth, both fuel economy and higher horsepower have increased about the same – 4.5-plus percent.

The demand for higher fuel economy has actually shrunk in that comparison having grown more than 60 percent in cy05 vs. cy04 while seeing a smaller 4.3 percent increase in the first quarter of '06 compared to cy05.

Horsepower, on the other hand, has increased from a negative 4 percent to an increase of 6+ percent in the same respective time frames.

Let's add another layer to this and look at what consumers say they are willing to spend for a hybrid model, since that type of vehicle is currently most associated with both environmental and oil discussions.



We asked new-vehicle intenders if they were considering a hybrid among their shopping list of possible automotive acquisitions. (CNW has the largest new-vehicle and used-vehicle intender data bases in the country.)

While consideration of a hybrid reached 40 percent in the Fall of 2005, it steadily declined through February of 2006 and rose only when new hybrid models were introduced (such as the

Highlander, Lexus RXh and others). Note that the April and May figures show a flattening of the consideration with the premium folks are willing to pay shrinking. (To view this Power Point analysis, go to www.PurchasePathOnline.com and click on the Power Point tab and the "Hybrid" sub-tab. If you do not have access to this site, request a guest pass at mailroom@cnwmr.com.)

So if consideration is so high, why are Honda Accord Hybrid sales struggling and Ford Escape Hybrids finding a better audience among police and taxi companies than among consumers?

The average American new-car buyer is only willing to spend so much for the environmental, oil and fuel economy positives of hybrids.

When asked about the premium they would be willing to spend for a hybrid over a comparable non-hybrid model, the peak in 2005 was about $3,500. That quickly evaporated and by March had fallen to $2,000. This is after receiving any government incentives.

One last item on hybrids and family fleets that should enter the discussion: How are different vehicles in a household used?

As mentioned, most hybrids are used for short trips. At least those that provide the highest fuel economy. But the family fleet is a flexible animal.

For example, the fuel economy within the family fleet of vehicles varies only slightly when a hybrid is added to the mix.

As an example, we looked at more than 6,500 households that had a mix of vehicles used regularly and measured the average mileage for each of those vehicles, the real-world fuel economy (not EPA figures) for each vehicle and calculated the entire family fleets miles per gallon.

Family Fleet Fuel Economy
Based on All Vehicles in Family

	% Primary Vehicle in HH	% Secondary Vehicle in HH	No. Vehicles in HH	Family Fleet Actual MPG* Avg. (Combined Hwy-City)
Toyota Prius	16.3%	83.7%	3.2	29.6
Ford Escape Hybrid	28.9%	71.1%	3.6	27.2
Honda Accord Hybrid	49.6%	50.4%	2.7	28.1
Dodge Ram Hemi	38.2%	61.8%	3.1	27.6
Ford Explorer	55.2%	44.8%	3.4	29.1
Chevrolet Suburban	27.4%	72.6%	3.1	26.9
VW Jetta	83.1%	16.9%	2.6	28.3
BMW 3 Series	61.2%	38.8%	3.5	25.2
Ford Crown Victoria	52.3%	47.7%	3.1	28.8

***Actual indicates respondent reported MPG actually received, not EPA numbers**

Source: CNW Marketing Research, Inc.

Note in the data above we found that the percentage of Prius's used as the household's primary vehicle was about 16 percent compared to a Ford Explorer's 55 percent. Prius owners also tended to have slightly more vehicles in the household than most of the other households measured.

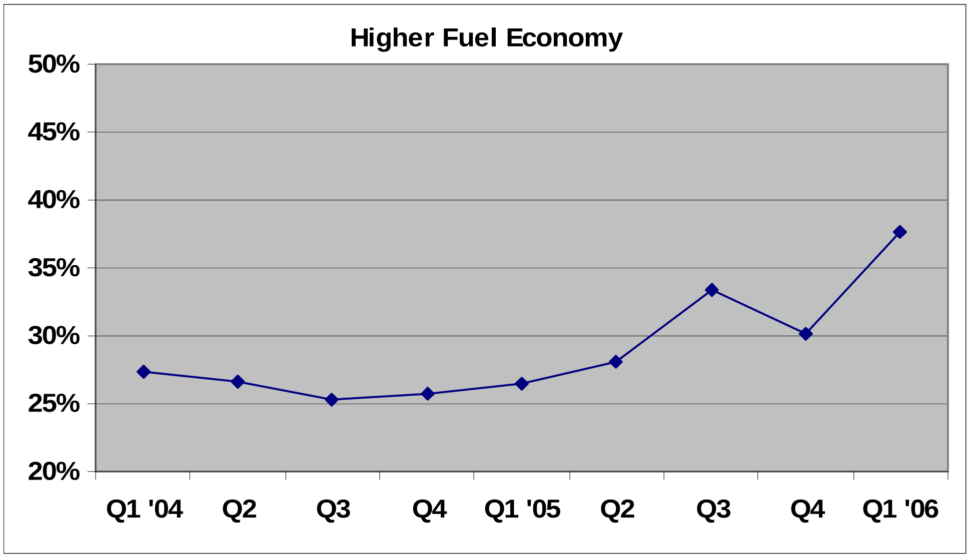
When we measured miles drive for each vehicle and actual mpg for each, we found that the household with a Prius among the fleet had an overall 29.6 mpg.

At the other extreme, the family that had a high-horsepower Dodge Ram Hemi pickup truck had a family fleet mpg of 27.6. It can be argued that even the two-miles-per-gallon difference is significant because every little bit of fuel economy reduces reliance on fossil fuels. At least in the hypothetical sense, that is true, but not quite so when all energy demands are taken into account such as previously discussed life expectancies and disposal.

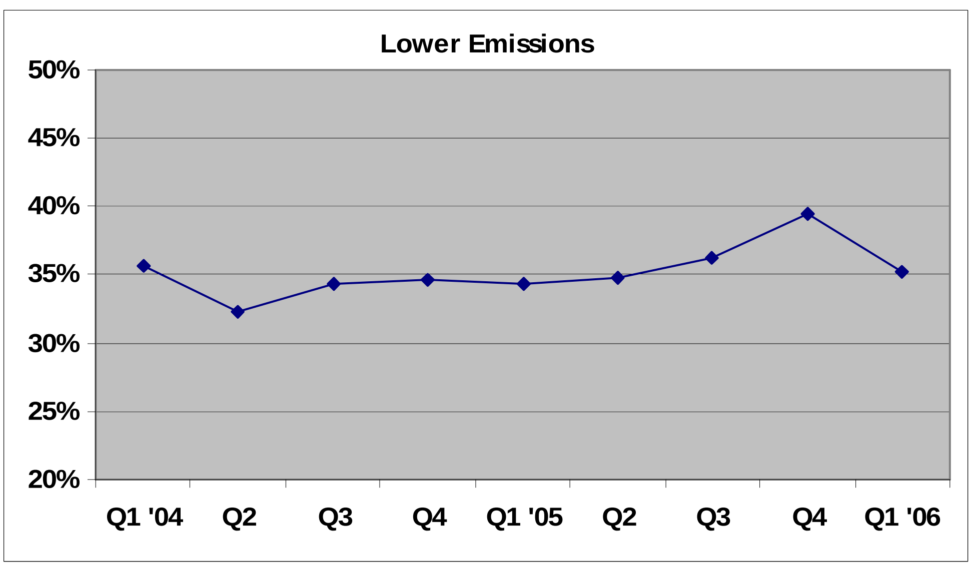
Additionally, if consumer found it necessary to have only one or two vehicles in the household, that car or truck would have to meet the extreme use rather than the lightest use. That is, if the choice is between a small car *and* a small SUV and one of the requirements is to tow a boat, the consumer is highly likely to select the SUV.

CNW tracks quarterly the reasons hybrid (and other segment types) owners give for having selected a particular model. What is the KEY motivator for buying a hybrid?

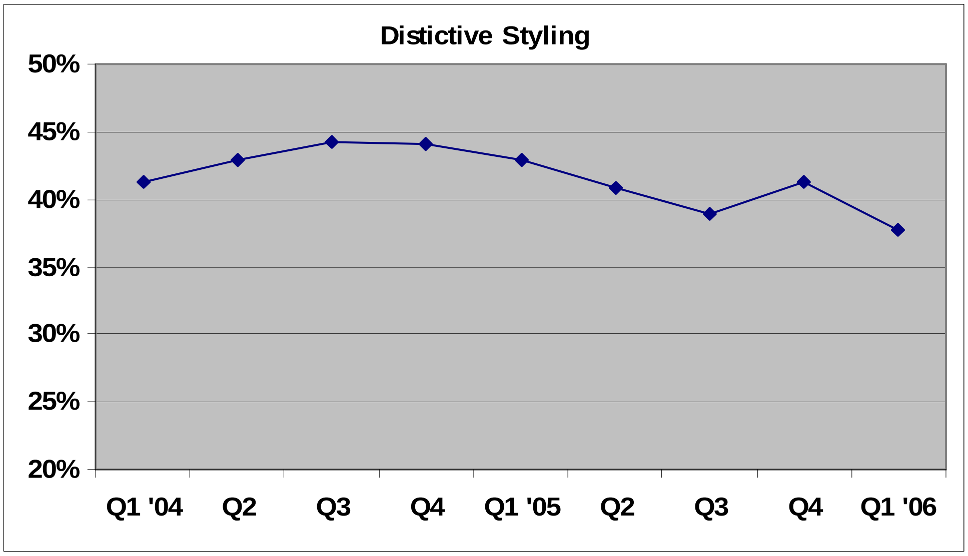
While fuel economy would be the primary “guess,” the reality is something quite different. Since the third quarter of 2005, this reason has been growing and is now listed as the primary or secondary reason for about 37 percent of buyers. (We ask owners to identify the two most important so the total adds to 200 percent.)



"Lower emissions" and pollution concerns ranked higher until the most current quarter when it dipped below fuel economy.

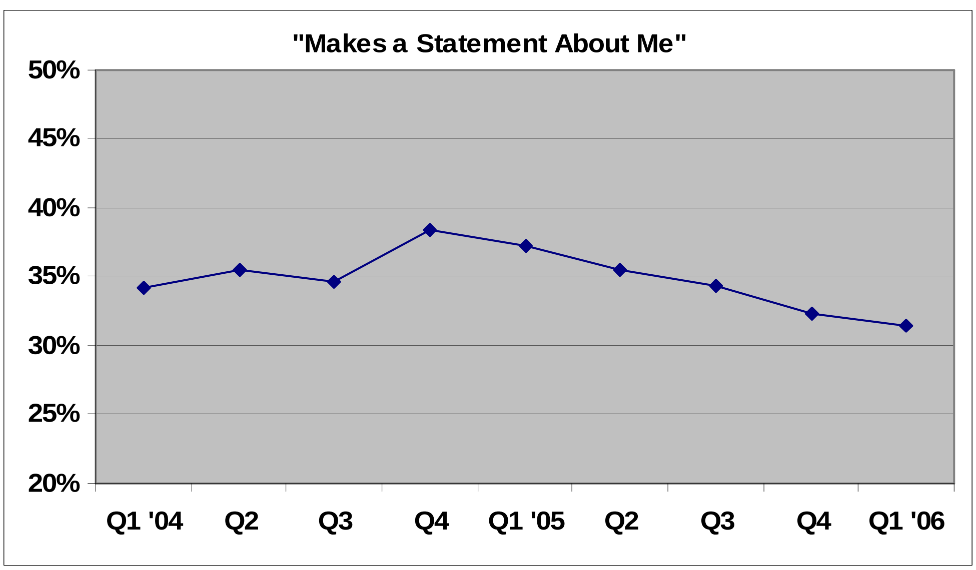


But a strong reason for selecting a hybrid is the "distinctive styling" or styling ques it projects or has. Insight buyers and Prius owners list this as a highly critical reason for making the particular selection. This also a likely reason the Ford Escape and Honda hybrids seem to be languishing. It simply can't be identified easily as a hybrid and for the premium paid it lacks instant recognition.



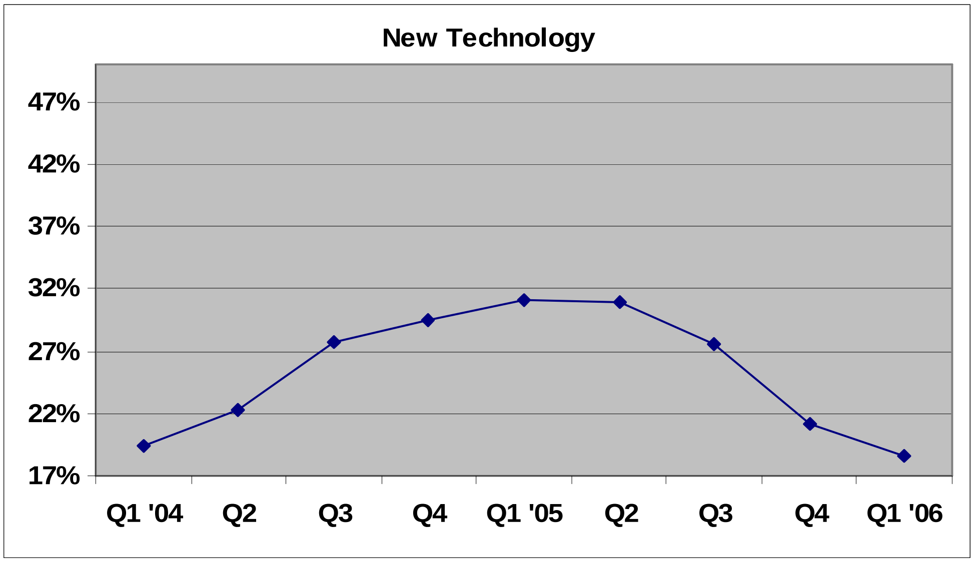
If that sounds somewhat cynical, consider the following graph.

Among the choices given to hybrid owners was "Makes a statement about me."



Fully a third of owners give this as their first or second reason for making a hybrid acquisition.

And without the styling cues, the statement is less than clear at first glance.



Not surprising, there is a significant part of the population that loves technology and especially advancements in same. They bought Beta instead of VHS, Macs instead of Windows PCs and hover around the Samsung web site waiting for the latest invention to come to market.

But the techies market is limited and quickly runs out of steam so it isn't surprising that among the latest owners of hybrids, new technology is fading as a key motivator.

One last point about hybrids: The vast majority of owners received 60 to 70 percent of the EPA fuel economy and dealers report a high incidence of customers coming back to find out "what's wrong."

Clearly the EPA static drive cycle test is not realistic when evaluating hybrids. While that may change in the future, it clearly is the case currently.

On a model-by-model basis, the next pages show the real-world fuel economies reported by more than half a million owners with the top and bottom 2 percent removed as either unrealistically high or uncharacteristically low.

Clearly every vehicle suffers a deterioration of fuel efficiency as parts age and replacement components are from aftermarket suppliers rather than “factory spec.” Engines become less efficient in general as internal parts wear. This has always been the case and there was no reason to doubt it would be the likelihood in the future.

From a technical standpoint, CNW looked at the historic fuel economies within categories and adjusted for real-world and current technologies, fuel types and blends and non-fossil fuel additives which generally produce lower mpgs.

Based on California standards and future anticipated requirements, we also evaluated the current engine technology’s response to those future fuels. Again, we found that it was likely to result in declining mpg over and above age deterioration.

We have rounded the first five years’ average fuel economy (FE) to the nearest tenth for computational reasons.

Segment	Division	Model	FE Yrs 1-5	FE Yrs 6-10	FE Yrs 10-Plus
b	**Kia**	Rio	31.40	27.92	24.00
b	**Hyundai**	Accent	31.20	27.70	23.97
b	**Chevrolet**	Aveo	32.70	28.92	24.88
b	**Toyota**	Echo	34.80	32.10	27.06
		Total Budget Cars	**32.53**	**29.16**	**24.98**
e	**Chevrolet**	Cobalt	29.20	26.90	21.79
e	**Toyota**	Matrix **	29.30	25.95	21.83
e	**Mazda**	Mazda3	28.20	25.83	21.29
e	**Nissan**	Sentra	27.60	24.43	21.12
e	**Suzuki**	Aerio	28.70	25.65	22.39
e	**Mitsubishi**	Lancer	25.60	23.51	19.22
e	**Kia**	Spectra	28.80	26.48	21.63
e	**Scion**	tC	25.10	22.45	19.44
e	**Suzuki**	Forenza	25.50	23.17	19.38
e	**Ford**	Focus	28.30	25.37	21.02
e	**Mazda**	Protégé	27.20	24.33	21.02
e	**Pontiac**	Sunfire	29.20	26.85	22.00
e	**Chevrolet**	Cavalier	29.70	26.83	23.17
e	**Scion**	xA	34.70	30.80	27.10
e	**Toyota**	Corolla	33.60	30.92	25.49
e	**Dodge**	Neon	28.20	25.04	21.94
e	**Hyundai**	Elantra	29.10	26.36	22.61
e	**Saturn**	Ion	30.20	27.77	22.60
e	**Ford**	Escort	29.40	26.57	21.91
e	**Scion**	xB	32.10	28.49	24.55
		Total Economy Cars	**28.99**	**26.18**	**22.08**
elsuv	**Nissan**	Xterra	16.50	15.15	12.36
elsuv	**Isuzu**	Trooper	19.90	18.17	14.88
elsuv	**Mazda**	Mazda5	23.60	21.44	17.92
elsuv	**Isuzu**	Rodeo	18.70	16.78	13.99
elsuv	**Suzuki**	XL-7	18.10	16.39	13.64
elsuv	**Suzuki**	Grand Vitara	18.80	17.28	14.70
elsuv	**Kia**	Sorento	17.90	16.51	13.60
elsuv	**Chevrolet**	Blazer	16.40	15.14	12.77
elsuv	**Suzuki**	Vitara	18.90	17.23	14.52
elsuv	**Isuzu**	Rodeo Sport	18.60	16.93	13.85
elsuv	**Kia**	Sportage	20.70	18.74	15.61
elsuv	**Jeep**	Liberty	22.30	20.55	17.27
elsuv	**Chevrolet**	Tracker	21.80	19.93	16.20
elsuv	**Jeep**	Wrangler	16.80	15.02	13.09
		Ttl Entry Level SUVs	**19.21**	**17.52**	**14.60**

elsw	**Mitsubishi**	Outlander	21.90	19.72	16.94
elsw	**Hyundai**	Tucson	21.10	19.27	16.45
elsw	**Mazda**	Tribute	21.60	19.27	16.79
elsw	**Hyundai**	Santa Fe	18.30	16.74	13.96
elsw	**Pontiac**	Torrent	19.60	17.44	15.18
elsw	**Ford**	Escape	21.10	19.46	16.32
elsw	**Mercury**	Mariner	21.80	19.84	16.20
elsw	**Toyota**	RAV4	22.30	19.84	16.82
elsw	**Saturn**	Vue	23.60	21.69	18.27
elsw	**Chevrolet**	Equinox	22.20	19.77	17.18
elsw	**Honda**	Element	23.40	21.25	17.53
elsw	**Pontiac**	Aztek	20.50	18.38	15.22
elsw	**Honda**	CR-V	23.40	21.46	18.28
		Ttl Entry Level Sportwagons	**21.60**	**19.55**	**16.55**
fspu	**Nissan**	Titan	14.60	13.18	10.92
fspu	**Toyota**	Tundra	15.40	14.21	11.99
fspu	**Dodge**	Ram pickup	17.10	15.34	13.11
fspu	**Chevrolet**	Silverado	16.70	15.17	12.47
fspu	**GMC**	Sierra	16.50	15.03	12.49
fspu	**Ford**	F Series	13.60	12.58	10.56
		Ttl Full Size Pickup	**15.65**	**14.25**	**11.93**
fsv	**GMC**	Savana/G Van	14.10	12.66	10.62
fsv	**Ford**	Econoline/Club Wagon	13.70	12.47	10.32
fsv	**GMC**	Express/G Van	15.20	13.60	11.52
fsv	**Dodge**	Sprinter Van	16.50	14.78	12.88
fsv	**Dodge**	Ram Van	13.60	12.13	10.23
fsv	**Ford**	Econoline van	14.20	12.98	10.95
		Full Size Van	**14.55**	**13.10**	**11.09**
hy	**Honda**	Accord Hybrid	30.80	27.88	23.70
hy	**Toyota**	Prius	45.20	40.45	34.71
hy	**Honda**	Civic Hybrid	44.10	40.11	34.02
hy	**Ford**	Escape Hybrid	32.70	29.03	24.84
hy	**Mercury**	Mariner Hybrid	30.90	28.10	23.45
hy	**Honda**	Insight	52.30	47.03	40.73
hy	**Lexus**	RX 400h	27.10	23.92	20.62
hy	**Toyota**	Highlander Hybrid	28.20	25.85	21.12
		Ttl Hybrids	**36.41**	**32.80**	**27.90**
l	**Volkswagen**	Phaeton	12.70	11.51	9.80
l	**Audi**	allroad quattro	16.70	15.18	12.85
l	**Audi**	A6	19.40	17.22	14.63
l	**Lexus**	LS 430	19.80	17.75	14.97
l	**Lexus**	GS 430	18.90	17.41	14.12
l	**Infiniti**	Q45	18.30	16.83	13.86
l	**Jaguar**	S-Type	18.40	16.34	13.64
l	**Infiniti**	M45	18.60	16.67	14.25
l	**Lexus**	GS 300	18.60	16.59	14.15

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l	**Cadillac**	DTS	19.70	18.01	14.91
l	**Cadillac**	DeVille	18.40	16.95	13.73
l	**M-Benz**	E class	17.10	15.42	12.85
l	**Cadillac**	Seville	14.70	13.39	11.49
l	**Volvo**	80 series	18.20	16.15	14.06
l	**Cadillac**	STS	19.80	18.13	15.14
l	**BMW**	5 Series	21.10	18.83	16.46
l	**Acura**	RL	20.20	17.89	15.45
l	**Lincoln**	Town Car	17.20	15.24	12.91
l	**BMW**	M3	17.60	15.65	13.72
		Total Luxury Car	**18.18**	**16.38**	**13.84**
lmr	**Volkswagen**	Golf	41.00	37.50	31.92
lmr	**Volkswagen**	Golf GTI	22.30	20.28	16.93
lmr	**Saturn**	L series	23.20	21.15	18.01
lmr	**Honda**	Civic	26.60	23.59	19.90
lmr	**Chevrolet**	HHR	22.70	20.14	17.07
lmr	**Pontiac**	G6	26.10	23.11	19.47
lmr	**Chevrolet**	Classic	28.40	25.94	21.31
lmr	**Subaru**	Impreza	21.60	19.77	16.14
lmr	**Pontiac**	Grand Am	23.10	20.56	17.66
lmr	**Ford**	Fusion	26.30	24.14	20.05
lmr	**Mercury**	Milan	25.90	23.72	19.95
lmr	**Dodge**	Stratus	25.70	23.25	19.83
lmr	**Kia**	Optima	28.60	26.38	22.06
lmr	**Hyundai**	Sonata	26.90	24.57	20.71
lmr	**Suzuki**	Verona	24.30	21.87	18.43
lmr	**Volkswagen**	Beetle	25.80	23.45	19.98
lmr	**Pontiac**	Vibe	30.60	28.27	22.73
lmr	**Chevrolet**	Malibu	27.50	25.41	21.26
lmr	**Chrysler**	PT Cruiser	23.10	20.88	17.65
lmr	**Chrysler**	Sebring	24.40	22.05	18.40
		Ttl Lower Mid-Range Cars	**26.21**	**23.80**	**19.97**
lmr suv	**Nissan**	Pathfinder	17.10	15.32	13.04
lmr suv	**Toyota**	4Runner	17.90	16.36	13.34
lmr suv	**Mitsubishi**	Montero	15.80	13.98	12.26
lmr suv	**Mitsubishi**	Montero Sport	16.20	14.80	12.40
lmr suv	**Isuzu**	Axiom	18.20	16.40	13.53
lmr suv	**Land Rover**	Freelander	18.70	17.03	14.31
lmr suv	**Isuzu**	Ascender	16.10	14.57	12.51
lmr suv	**Jeep**	Commander	17.20	15.18	12.80
lmr suv	**Jeep**	Grand Cherokee	16.30	14.58	12.10
lmr suv	**Jeep**	Grand Cherokee SRT-8	12.90	11.68	10.06
lmr suv	**Dodge**	Durango	15.80	14.62	12.03
lmr suv	**Ford**	Explorer	16.10	14.87	12.06
lmr suv	**Chevrolet**	TrailBlazer	17.60	15.90	13.49
		Ttl Lower Mid-Range SUV	**16.61**	**15.02**	**12.61**
lsuv	**Toyota**	Sequoia	14.90	13.64	11.11

lsuv	**Nissan**	Armada	13.10	11.63	9.89
lsuv	**Ford**	Excursion	13.20	11.92	10.19
lsuv	**Chevrolet**	Suburban	16.20	14.48	12.21
lsuv	**GMC**	Yukon XL	15.80	14.20	11.94
lsuv	**Ford**	Expedition	14.30	12.97	11.16
lsuv	**Chevrolet**	Tahoe	17.80	15.80	13.22
lsuv	**GMC**	Yukon	17.60	15.62	13.30
		Total Large SUV	**15.36**	**13.78**	**11.63**
mrsw	**Chrysler**	Pacifica	20.30	18.39	15.44
mrsw	**Nissan**	Murano	23.50	21.35	17.54
mrsw	**Toyota**	Highlander	23.30	21.04	18.18
mrsw	**Ford**	Freestyle/Windstar	19.40	17.15	15.01
mrsw	**Buick**	Rendezvous	24.70	22.45	19.25
mrsw	**Honda**	Pilot	20.20	17.85	15.79
mrsw	**Mitsubishi**	Endeavor	22.60	20.10	17.59
		Total Mid-Range Sportwagons	**22.00**	**19.76**	**16.97**
mv	**Volkswagen**	EuroVan/T4	19.70	18.22	15.27
mv	**Honda**	Odyssey	21.40	19.06	16.33
mv	**Pontiac**	Montana SV6	19.10	17.69	14.75
mv	**Chrysler**	Town & Country	22.30	19.70	17.12
mv	**Buick**	Terraza	18.80	17.28	14.14
mv	**Dodge**	Caravan/Grand Caravan	21.80	20.02	16.25
mv	**Toyota**	Sienna	24.30	21.98	18.42
mv	**Chevrolet**	Venture	17.60	16.05	13.21
mv	**Saturn**	Relay	20.90	18.62	16.25
mv	**Pontiac**	Montana	23.20	21.19	17.29
mv	**Nissan**	Quest	24.30	21.80	18.65
mv	**Chevrolet**	Uplander	18.10	16.30	13.93
mv	**Ford**	Freestar	19.40	17.14	15.09
mv	**Mercury**	Monterey	20.20	17.83	15.71
mv	**Kia**	Sedona	17.60	15.96	13.23
mv	**Mazda**	MPV	20.80	19.15	15.98
mv	**GMC**	Safari	18.80	16.87	14.41
mv	**Chevrolet**	Astro	17.60	15.57	13.53
		Total Minivans	**20.33**	**18.36**	**15.53**
nl	**Volvo**	70 series	18.10	16.37	13.64
nl	**Volvo**	60 series	17.90	16.57	13.66
nl	**Mercury**	Zephyr	22.50	20.72	17.18
nl	**Acura**	TL	25.60	22.86	19.10
nl	**Acura**	CL	25.90	23.44	19.25
nl	**Lincoln**	LS	22.30	20.01	16.67
nl	**Jaguar**	X-Type	22.50	20.24	17.05
nl	**Lexus**	ES 330	22.10	19.89	16.84
nl	**Lexus**	IS 300	24.60	22.28	19.06
nl	**Infiniti**	G35	24.30	21.63	18.79
nl	**M-Benz**	C class	22.90	20.97	17.51
nl	**Cadillac**	CTS	23.40	20.68	17.78

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nl	**BMW**	330	22.20	20.04	16.58
nl	**Buick**	Park Avenue	22.90	20.25	17.26
nl	**BMW**	325	21.30	19.44	16.18
nl	**Saab**	9-5	23.20	20.59	17.68
		Total Near Luxury Cars	**22.61**	**20.37**	**17.14**
p	**Audi**	A8	18.50	16.90	14.32
p	**M-Benz**	S class	16.30	14.46	12.38
p	**Maserati**	Maserati	12.20	11.25	9.36
p	**BMW**	7 Series	21.70	19.18	16.70
p	**Jaguar**	XJ	23.90	21.39	17.77
		Total Premium Cars	**18.52**	**16.64**	**14.11**
pmr	**Mercury**	Montego	22.20	19.74	17.11
pmr	**Buick**	LaCrosse	24.30	21.78	18.43
pmr	**Volkswagen**	Passat	26.60	24.39	20.15
pmr	**Dodge**	Magnum	22.40	20.59	17.24
pmr	**Ford**	Five Hundred	22.10	19.69	17.28
pmr	**Dodge**	Charger	23.60	21.81	17.86
pmr	**Nissan**	Maxima	26.40	23.44	19.67
pmr	**Chrysler**	300/300M	19.90	17.71	15.26
pmr	**Mitsubishi**	Diamante	23.40	20.66	17.54
pmr	**Volvo**	40 series	25.30	23.24	19.30
pmr	**Infiniti**	I30/I35	25.70	23.50	19.79
pmr	**Mazda**	Millenia	24.10	22.18	18.25
pmr	**Audi**	A4/S4	18.30	16.40	13.78
pmr	**Audi**	S4	18.60	17.04	14.33
pmr	**Acura**	TSX	27.60	24.39	21.40
pmr	**Saab**	9-3	24.40	21.53	18.84
pmr	**Saab**	9-2	22.20	20.47	16.69
pmr	**Buick**	Regal	23.70	21.39	17.72
		Total Premium Mid-Range Cars	**23.38**	**21.11**	**17.81**
ps	**M-Benz**	SLK class	20.30	18.11	15.11
ps	**M-Benz**	CLS class	22.20	20.46	16.81
ps	**M-Benz**	CLK class	19.10	17.21	14.32
ps	**Porsche**	Boxster	21.10	18.97	16.10
ps	**Chevrolet**	Corvette	22.60	20.57	17.54
ps	**Audi**	TT	25.90	23.96	19.66
ps	**BMW**	Z8	19.60	18.01	14.88
ps	**BMW**	Z4	26.70	24.41	20.28
ps	**Ford**	Thunderbird	20.30	18.62	15.86
ps	**Chrysler**	Crossfire	19.60	17.77	14.59
		Total Premium Sporty Cars	**21.74**	**19.81**	**16.51**
psuv	**Porsche**	Cayenne	16.20	14.61	12.66
psuv	**Volkswagen**	Touareg	17.80	16.17	13.79
psuv	**Land Rover**	Range Rover	13.70	12.57	10.46
psuv	**M-Benz**	G class	12.50	11.32	9.39
psuv	**Hummer**	H1	13.60	12.29	10.22

psuv	**Lexus**	LX 470	14.20	12.89	10.61
psuv	**Cadillac**	Escalade ESV	17.10	15.68	13.33
psuv	**Toyota**	Land Cruiser	14.30	12.88	10.76
psuv	**Hummer**	H2	16.90	14.91	12.92
psuv	**Cadillac**	Escalade	17.60	16.04	13.61
psuv	**Lincoln**	Navigator	14.30	12.64	10.89
		Total Premium SUV	**15.29**	**13.82**	**11.69**
psw	**Volvo**	XC90	20.80	18.42	16.07
psw	**Lexus**	RX330	21.80	19.72	16.66
psw	**Infiniti**	FX35	17.30	15.45	13.32
psw	**Infiniti**	FX45	15.20	13.89	11.77
psw	**M-Benz**	R class	17.40	15.55	13.11
psw	**Volvo**	50 series	25.60	23.56	19.32
psw	**Acura**	MDX	21.10	19.25	16.04
psw	**Cadillac**	SRX	18.40	16.79	14.13
psw	**M-Benz**	M class	15.50	13.84	11.77
psw	**BMW**	X5	17.60	15.92	13.59
psw	**BMW**	X3	20.60	18.40	15.76
		Total Premium Sportwagons	**19.21**	**17.34**	**14.69**
smr	**Honda**	Accord	25.40	22.80	19.28
smr	**Volkswagen**	Jetta wagon	24.30	21.90	18.95
smr	**Volkswagen**	Jetta	28.70	26.40	21.35
smr	**Toyota**	Camry	28.20	25.08	21.10
smr	**Subaru**	Baja	23.10	21.38	17.61
smr	**Subaru**	Legacy	26.60	23.55	20.30
smr	**Subaru**	Forester	22.10	19.55	16.96
smr	**Subaru**	Outback	23.70	20.97	17.69
smr	**Mazda**	Mazda6	27.60	25.04	21.13
smr	**Dodge**	Intrepid	19.90	17.60	15.08
smr	**Chevrolet**	Monte Carlo	23.40	21.00	18.10
smr	**Mitsubishi**	Galant	25.60	23.44	19.18
smr	**Pontiac**	Grand Prix	23.60	21.17	17.63
smr	**Buick**	Century	24.10	22.07	18.56
smr	**Mercury**	Sable	24.20	21.92	18.82
smr	**Ford**	Taurus	23.20	21.35	17.42
smr	**Mazda**	626	21.40	19.39	16.55
smr	**Nissan**	Altima	26.20	23.36	20.11
smr	**Chevrolet**	Impala	23.40	21.47	17.74
smr	**Hyundai**	XG350	25.20	22.29	18.75
smr	**Kia**	Amanti	21.60	19.50	16.51
		Total Small Rid-Range Cars	**24.36**	**21.96**	**18.52**
spu	**Chevrolet**	SSR	14.10	12.59	10.48
spu	**Honda**	Ridgeline	16.80	14.88	12.80
spu	**GMC**	Canyon	19.80	17.73	14.97
spu	**GMC**	Sonoma	19.40	17.19	15.14
spu	**Nissan**	Frontier	18.30	16.64	13.86
spu	**Toyota**	Tacoma	23.40	21.04	17.74

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spu	**Chevrolet**	Colorado	18.70	16.94	14.04
spu	**Mitsubishi**	Raider	17.30	15.82	13.45
spu	**Mazda**	B-Series	15.20	13.49	11.55
spu	**Dodge**	Dakota	17.80	15.88	13.89
spu	**Ford**	Ranger	19.40	17.70	14.60
spu	**Chevrolet**	S10	22.80	20.70	17.21
		Total Small Pickup	**18.58**	**16.72**	**14.14**
sup	**Cadillac**	Escalade EXT	14.60	12.98	11.09
sup	**Chevrolet**	Avalanche	13.10	11.84	9.97
sup	**Lincoln**	Mark LT	14.80	13.12	11.51
		Total Specialty Utility Pickup	**14.17**	**12.64**	**10.86**
t	**Mazda**	RX8	19.90	18.14	15.21
t	**Nissan**	350Z	23.80	21.01	18.33
t	**Audi**	A3	27.20	24.12	20.50
t	**Mitsubishi**	Eclipse Spyder	24.50	22.66	18.94
t	**Mitsubishi**	Eclipse	24.80	22.67	18.59
t	**Pontiac**	GTO	18.70	17.25	14.54
t	**Toyota**	Celica	28.80	25.64	22.08
t	**Mini**	Mini Cooper S	27.10	24.27	20.18
t	**Acura**	RSX	28.20	25.20	21.42
t	**Pontiac**	Solstice	24.60	21.83	19.05
t	**Mini**	Mini Cooper	30.30	27.37	23.20
t	**Ford**	Mustang	22.50	20.36	16.70
t	**Toyota**	MR2 Spyder	27.40	24.26	21.17
t	**Mazda**	MX-5 Miata	23.80	21.77	17.65
t	**Honda**	S2000	20.60	18.61	15.59
t	**Hyundai**	Tiburon	25.30	22.78	19.68
t	**Pontiac**	Firebird	19.20	17.61	14.35
t	**Chevrolet**	Camaro	18.70	17.05	13.87
		Total Touring	**24.19**	**21.81**	**18.39**
tr	**Toyota**	Avalon	26.50	23.66	20.62
tr	**Buick**	Lucerne	24.80	22.18	18.71
tr	**Pontiac**	Bonneville	19.10	17.43	14.54
tr	**Chrysler**	Concorde	20.40	18.15	15.87
tr	**Mercury**	Grand Marquis	24.30	22.16	18.74
tr	**Ford**	Crown Victoria	23.10	21.09	17.34
tr	**Buick**	LeSabre	23.20	20.85	17.89
		Total Traditional Car	**23.06**	**20.79**	**17.67**
u	**Maybach**	Maybach	11.30	10.43	8.73
u	**Rolls-Royce**	Rolls-Royce	11.80	10.93	8.82
ul	**Bentley**	Bentley	12.60	11.19	9.72
ul	**Porsche**	Carrera GT	11.20	10.05	8.46
ul	**Lamborghini**	Lamborghini	10.10	8.98	7.79
ul	**Ferrar**	Ferrari	9.80	8.88	7.54
ul	**Ford**	GT	14.20	12.82	10.69
ul	**Aston Martin**	Aston Martin	14.10	12.77	10.67

		Total Ultra Luxury	**11.89**	**10.76**	**9.05**
umr suv	**Lexus**	GX 470	16.30	15.09	12.63
umr suv	**Land Rover**	Discovery	16.70	15.22	12.52
umr suv	**Land Rover**	LR3	14.80	13.38	11.43
umr suv	**Infiniti**	QX4	16.10	14.44	12.33
umr suv	**Land Rover**	Range Rover Sport	15.70	14.24	11.97
umr suv	**Lincoln**	Aviator	14.10	12.57	10.64
umr suv	**Mercury**	Mountaineer	15.60	14.40	12.16
umr suv	**Subaru**	B9 Tribeca	18.20	16.23	13.67
umr suv	**GMC**	Envoy	16.40	14.70	12.20
umr suv	**Buick**	Rainier	20.40	18.58	15.17
umr suv	**Saab**	9-7X	17.80	16.02	13.69
umr suv	**Hummer**	H3	18.10	16.08	13.86
		Total Upper Mid-Range SUV	**16.68**	**15.08**	**12.69**
ups	**Acura**	NSX	18.20	16.58	13.56
ups	**M-Benz**	SC 430	20.10	18.10	14.91
ups	**Cadillac**	XLR	18.40	16.40	14.12
ups	**Jaguar**	XK	18.70	16.65	14.30
ups	**Porsche**	911 Carrera 4	14.60	13.51	11.17
ups	**Porsche**	911 Carrera	12.20	11.19	9.41
ups	**M-Benz**	SL Coupe/Roadster	15.30	13.79	11.49
ups	**M-Benz**	CL class	22.50	20.74	17.38
ups	**BMW**	6 Series	17.90	16.52	13.57
ups	**Lotus**	Lotus	24.20	22.16	17.99
ups	**Dodge**	Viper	13.70	12.15	10.19
		Total Upper Premium Sportscars	**17.80**	**16.16**	**13.46**
		Industry Straight Average	**22.93**	**20.72**	**17.48**

Interestingly, the variance between models and segments is small when looked at in a share of original fuel economy deterioration over the life of a vehicle. That is, the normal fuel economy loss for years 10-plus vs. original fuel economy is in the 76 to 79 percent range regardless of engine technology or fuel management sophistication. This applies to hybrids as well.

Mechanics and physics are at work here, not simple extrapolations. For example, the same deterioration pattern was seen with V8 diesel engines tracked by CNW in the ‘80s and gasoline four-cylinder engines between 1985 and 1995. Both were tracked as part of a project to determine the life-cycle fuel economy of various engine types for an internal project related to warranty work expectations.

Division	Model	FE % of New Yrs 6-10	FE % of New Yrs 10-Plus
Kia	Rio	88.92%	76.43%
Hyundai	Accent	88.78%	76.84%
Chevrolet	Aveo	88.45%	76.08%
Toyota	Echo	92.23%	77.75%
	Total Budget Cars	**89.60%**	**76.78%**
Chevrolet	Cobalt	92.11%	74.63%
Toyota	Matrix **	88.57%	74.50%
Mazda	Mazda3	91.61%	75.51%
Nissan	Sentra	88.53%	76.53%
Suzuki	Aerio	89.38%	78.01%
Mitsubishi	Lancer	91.82%	75.06%
Kia	Spectra	91.93%	75.10%
Scion	tC	89.46%	77.47%
Suzuki	Forenza	90.87%	76.01%
Ford	Focus	89.66%	74.28%
Mazda	Protégé	89.44%	77.29%
Pontiac	Sunfire	91.95%	75.34%
Chevrolet	Cavalier	90.32%	78.00%
Scion	xA	88.76%	78.10%
Toyota	Corolla	92.02%	75.87%
Dodge	Neon	88.81%	77.80%
Hyundai	Elantra	90.57%	77.71%
Saturn	Ion	91.97%	74.83%
Ford	Escort	90.37%	74.52%
Scion	xB	88.74%	76.47%
	Total Economy Cars	**90.34%**	**76.15%**
Nissan	Xterra	91.81%	74.92%
Isuzu	Trooper	91.30%	74.77%
Mazda	Mazda5	90.83%	75.95%
Isuzu	Rodeo	89.72%	74.80%
Suzuki	XL-7	90.56%	75.37%
Suzuki	Grand Vitara	91.89%	78.17%
Kia	Sorento	92.23%	76.00%
Chevrolet	Blazer	92.31%	77.85%
Suzuki	Vitara	91.15%	76.85%
Isuzu	Rodeo Sport	91.00%	74.45%
Kia	Sportage	90.54%	75.43%
Jeep	Liberty	92.16%	77.46%

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Chevrolet	Tracker	91.40%	74.30%
Jeep	Wrangler	89.38%	77.89%
	Ttl Entry Level SUVs	**91.16%**	**76.02%**
Mitsubishi	Outlander	90.06%	77.34%
Hyundai	Tucson	91.35%	77.96%
Mazda	Tribute	89.20%	77.74%
Hyundai	Santa Fe	91.49%	76.27%
Pontiac	Torrent	89.00%	77.45%
Ford	Escape	92.24%	77.34%
Mercury	Mariner	90.99%	74.29%
Toyota	RAV4	88.97%	75.44%
Saturn	Vue	91.89%	77.43%
Chevrolet	Equinox	89.06%	77.38%
Honda	Element	90.80%	74.90%
Pontiac	Aztek	89.67%	74.25%
Honda	CR-V	91.69%	78.13%
	Ttl Entry Level Sportwagons	**90.49%**	**76.61%**
Nissan	Titan	90.27%	74.82%
Toyota	Tundra	92.28%	77.88%
Dodge	Ram pickup	89.69%	76.67%
Chevrolet	Silverado	90.85%	74.70%
GMC	Sierra	91.09%	75.72%
Ford	F Series	92.50%	77.64%
	Ttl Full Size Pickup	**91.11%**	**76.24%**
GMC	Savana/G Van	89.79%	75.32%
Ford	Econoline/Club Wagon	91.00%	75.32%
GMC	Express/G Van	89.45%	75.80%
Dodge	Sprinter Van	89.58%	78.05%
Dodge	Ram Van	89.19%	75.23%
Ford	Econoline van	91.41%	77.13%
	Full Size Van	**90.07%**	**76.14%**
Honda	Accord Hybrid	90.53%	76.96%
Toyota	Prius	89.49%	76.80%
Honda	Civic Hybrid	90.95%	77.15%
Ford	Escape Hybrid	88.77%	75.97%
Mercury	Mariner Hybrid	90.95%	75.88%
Honda	Insight	89.92%	77.87%
Lexus	RX 400h	88.26%	76.08%
Toyota	Highlander Hybrid	91.68%	74.88%
	Ttl Hybrids	**90.07%**	**76.45%**
Volkswagen	Phaeton	90.60%	77.17%
Audi	allroad quattro	90.90%	76.93%
Audi	A6	88.74%	75.41%
Lexus	LS 430	89.66%	75.62%
Lexus	GS 430	92.09%	74.69%

Infiniti	Q45	91.95%	75.76%
Jaguar	S-Type	88.80%	74.15%
Infiniti	M45	89.64%	76.61%
Lexus	GS 300	89.18%	76.06%
Cadillac	DTS	91.44%	75.68%
Cadillac	DeVille	92.10%	74.61%
M-Benz	E class	90.20%	75.12%
Cadillac	Seville	91.10%	78.15%
Volvo	80 series	88.73%	77.23%
Cadillac	STS	91.55%	76.47%
BMW	5 Series	89.25%	78.02%
Acura	RL	88.55%	76.48%
Lincoln	Town Car	88.58%	75.06%
BMW	M3	88.92%	77.94%
	Total Luxury Car	**90.10%**	**76.17%**
Volkswagen	Golf	91.46%	77.86%
Volkswagen	Golf GTI	90.95%	75.90%
Saturn	L series	91.17%	77.61%
Honda	Civic	88.69%	74.82%
Chevrolet	HHR	88.74%	75.19%
Pontiac	G6	88.55%	74.59%
Chevrolet	Classic	91.35%	75.05%
Subaru	Impreza	91.53%	74.71%
Pontiac	Grand Am	89.00%	76.45%
Ford	Fusion	91.78%	76.24%
Mercury	Milan	91.57%	77.01%
Dodge	Stratus	90.48%	77.17%
Kia	Optima	92.24%	77.13%
Hyundai	Sonata	91.32%	77.00%
Suzuki	Verona	90.02%	75.84%
Volkswagen	Beetle	90.89%	77.46%
Pontiac	Vibe	92.39%	74.29%
Chevrolet	Malibu	92.39%	77.32%
Chrysler	PT Cruiser	90.40%	76.41%
Chrysler	Sebring	90.38%	75.39%
	Ttl Lower Mid-Range Cars	**90.77%**	**76.17%**
Nissan	Pathfinder	89.57%	76.27%
Toyota	4Runner	91.41%	74.53%
Mitsubishi	Montero	88.46%	77.61%
Mitsubishi	Montero Sport	91.37%	76.56%
Isuzu	Axiom	90.11%	74.34%
Land Rover	Freelander	91.09%	76.55%
Isuzu	Ascender	90.51%	77.69%
Jeep	Commander	88.26%	74.40%
Jeep	Grand Cherokee	89.43%	74.22%
Jeep	Grand Cherokee SRT-8	90.56%	77.99%
Dodge	Durango	92.52%	76.12%
Ford	Explorer	92.37%	74.91%

Chevrolet	TrailBlazer	90.35%	76.66%
	Ttl Lower Mid-Range SUV	**90.46%**	**75.99%**
Toyota	Sequoia	91.54%	74.55%
Nissan	Armada	88.81%	75.51%
Ford	Excursion	90.31%	77.22%
Chevrolet	Suburban	89.38%	75.37%
GMC	Yukon XL	89.89%	75.60%
Ford	Expedition	90.68%	78.03%
Chevrolet	Tahoe	88.75%	74.27%
GMC	Yukon	88.75%	75.57%
	Total Large SUV	**89.76%**	**75.77%**
Chrysler	Pacifica	90.57%	76.08%
Nissan	Murano	90.87%	74.62%
Toyota	Highlander	90.32%	78.03%
Ford	Freestyle/Windstar	88.42%	77.38%
Buick	Rendezvous	90.88%	77.93%
Honda	Pilot	88.36%	78.15%
Mitsubishi	Endeavor	88.95%	77.85%
	Total Mid-Range Sportwagons	**89.77%**	**77.15%**
Volkswagen	EuroVan/T4	92.48%	77.53%
Honda	Odyssey	89.08%	76.32%
Pontiac	Montana SV6	92.60%	77.20%
Chrysler	Town & Country	88.36%	76.78%
Buick	Terraza	91.93%	75.21%
Dodge	Caravan/Grand Caravan	91.85%	74.52%
Toyota	Sienna	90.44%	75.80%
Chevrolet	Venture	91.20%	75.07%
Saturn	Relay	89.10%	77.73%
Pontiac	Montana	91.33%	74.51%
Nissan	Quest	89.72%	76.75%
Chevrolet	Uplander	90.03%	76.94%
Ford	Freestar	88.33%	77.80%
Mercury	Monterey	88.26%	77.77%
Kia	Sedona	90.69%	75.17%
Mazda	MPV	92.09%	76.82%
GMC	Safari	89.74%	76.65%
Chevrolet	Astro	88.49%	76.87%
	Total Minivans	**90.32%**	**76.41%**
Volvo	70 series	90.46%	75.34%
Volvo	60 series	92.59%	76.33%
Mercury	Zephyr	92.07%	76.37%
Acura	TL	89.31%	74.62%
Acura	CL	90.51%	74.33%
Lincoln	LS	89.74%	74.77%
Jaguar	X-Type	89.96%	75.76%
Lexus	ES 330	89.99%	76.20%

Lexus	IS 300	90.56%	77.49%
Infiniti	G35	89.03%	77.32%
M-Benz	C class	91.57%	76.48%
Cadillac	CTS	88.38%	76.00%
BMW	330	90.29%	74.68%
Buick	Park Avenue	88.43%	75.38%
BMW	325	91.25%	75.98%
Saab	9-5	88.74%	76.21%
	Total Near Luxury Cars	**90.18%**	**75.83%**
Audi	A8	91.37%	77.39%
M-Benz	S class	88.71%	75.98%
Maserati	Maserati	92.22%	76.70%
BMW	7 Series	88.38%	76.96%
Jaguar	XJ	89.50%	74.35%
	Total Premium Cars	**90.04%**	**76.28%**
Mercury	Montego	88.93%	77.08%
Buick	LaCrosse	89.62%	75.83%
Volkswagen	Passat	91.70%	75.74%
Dodge	Magnum	91.93%	76.96%
Ford	Five Hundred	89.10%	78.17%
Dodge	Charger	92.41%	75.69%
Nissan	Maxima	88.79%	74.49%
Chrysler	300/300M	88.98%	76.69%
Mitsubishi	Diamante	88.30%	74.95%
Volvo	40 series	91.84%	76.27%
Infiniti	I30/I35	91.43%	77.00%
Mazda	Millenia	92.05%	75.72%
Audi	A4/S4	89.63%	75.32%
Audi	S4	91.60%	77.02%
Acura	TSX	88.37%	77.53%
Saab	9-3	88.22%	77.21%
Saab	9-2	92.22%	75.19%
Buick	Regal	90.27%	74.78%
	Total Premium Mid-Range Cars	**90.30%**	**76.20%**
M-Benz	SLK class	89.23%	74.42%
M-Benz	CLS class	92.15%	75.73%
M-Benz	CLK class	90.10%	74.95%
Porsche	Boxster	89.89%	76.30%
Chevrolet	Corvette	91.00%	77.60%
Audi	TT	92.50%	75.91%
BMW	Z8	91.90%	75.94%
BMW	Z4	91.44%	75.94%
Ford	Thunderbird	91.73%	78.11%
Chrysler	Crossfire	90.65%	74.42%
	Total Premium Sporty Cars	**91.06%**	**75.93%**
Porsche	Cayenne	90.19%	78.12%

Volkswagen	Touareg	90.82%	77.49%
Land Rover	Range Rover	91.76%	76.34%
M-Benz	G class	90.53%	75.13%
Hummer	H1	90.36%	75.13%
Lexus	LX 470	90.79%	74.74%
Cadillac	Escalade ESV	91.72%	77.95%
Toyota	Land Cruiser	90.04%	75.23%
Hummer	H2	88.23%	76.47%
Cadillac	Escalade	91.15%	77.33%
Lincoln	Navigator	88.37%	76.18%
	Total Premium SUV	**90.36%**	**76.37%**
Volvo	XC90	88.56%	77.25%
Lexus	RX330	90.46%	76.40%
Infiniti	FX35	89.30%	77.00%
Infiniti	FX45	91.38%	77.42%
M-Benz	R class	89.34%	75.37%
Volvo	50 series	92.02%	75.48%
Acura	MDX	91.24%	76.01%
Cadillac	SRX	91.25%	76.78%
M-Benz	M class	89.26%	75.96%
BMW	X5	90.45%	77.21%
BMW	X3	89.33%	76.51%
	Total Premium Sportwagons	**90.24%**	**76.49%**
Honda	Accord	89.75%	75.91%
Volkswagen	Jetta wagon	90.14%	77.97%
Volkswagen	Jetta	91.97%	74.38%
Toyota	Camry	88.95%	74.84%
Subaru	Baja	92.55%	76.25%
Subaru	Legacy	88.55%	76.32%
Subaru	Forester	88.46%	76.73%
Subaru	Outback	88.50%	74.66%
Mazda	Mazda6	90.71%	76.57%
Dodge	Intrepid	88.43%	75.79%
Chevrolet	Monte Carlo	89.73%	77.36%
Mitsubishi	Galant	91.56%	74.94%
Pontiac	Grand Prix	89.70%	74.69%
Buick	Century	91.58%	77.03%
Mercury	Sable	90.59%	77.75%
Ford	Taurus	92.04%	75.09%
Mazda	626	90.63%	77.32%
Nissan	Altima	89.15%	76.75%
Chevrolet	Impala	91.75%	75.82%
Hyundai	XG350	88.46%	74.41%
Kia	Amanti	90.30%	76.45%
	Total Small Rid-Range Cars	**90.17%**	**76.05%**
Chevrolet	SSR	89.31%	74.35%
Honda	Ridgeline	88.60%	76.18%

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GMC	Canyon	89.53%	75.62%
GMC	Sonoma	88.63%	78.05%
Nissan	Frontier	90.94%	75.72%
Toyota	Tacoma	89.93%	75.83%
Chevrolet	Colorado	90.59%	75.09%
Mitsubishi	Raider	91.46%	77.77%
Mazda	B-Series	88.73%	75.98%
Dodge	Dakota	89.20%	78.04%
Ford	Ranger	91.22%	75.24%
Chevrolet	S10	90.78%	75.47%
	Total Small Pickup	**89.91%**	**76.11%**
Cadillac	Escalade EXT	88.87%	75.94%
Chevrolet	Avalanche	90.35%	76.14%
Lincoln	Mark LT	88.66%	77.77%
	Total Specialty Utility Pickup	**89.29%**	**76.62%**
Mazda	RX8	91.15%	76.43%
Nissan	350Z	88.29%	77.00%
Audi	A3	88.69%	75.37%
Mitsubishi	Eclipse Spyder	92.50%	77.31%
Mitsubishi	Eclipse	91.41%	74.97%
Pontiac	GTO	92.24%	77.77%
Toyota	Celica	89.02%	76.68%
Mini	Mini Cooper S	89.57%	74.46%
Acura	RSX	89.35%	75.94%
Pontiac	Solstice	88.75%	77.43%
Mini	Mini Cooper	90.33%	76.58%
Ford	Mustang	90.48%	74.24%
Toyota	MR2 Spyder	88.55%	77.26%
Mazda	MX-5 Miata	91.45%	74.14%
Honda	S2000	90.36%	75.69%
Hyundai	Tiburon	90.02%	77.77%
Pontiac	Firebird	91.71%	74.74%
Chevrolet	Camaro	91.16%	74.18%
	Total Touring	**90.28%**	**76.00%**
Toyota	Avalon	89.29%	77.81%
Buick	Lucerne	89.43%	75.43%
Pontiac	Bonneville	91.25%	76.10%
Chrysler	Concorde	88.96%	77.77%
Mercury	Grand Marquis	91.19%	77.12%
Ford	Crown Victoria	91.28%	75.05%
Buick	LeSabre	89.87%	77.11%
	Total Traditional Car	**90.18%**	**76.63%**
Maybach	Maybach	92.26%	77.24%
Rolls-Royce	Rolls-Royce	92.60%	74.74%
Bentley	Bentley	88.84%	77.15%
Porsche	Carrera GT	89.73%	75.57%

Lamborghini	Lamborghini	88.92%	77.10%
Ferrar	Ferrari	90.63%	76.93%
Ford	GT	90.26%	75.29%
Aston Martin	Aston Martin	90.55%	75.70%
	Total Ultra Luxury	**90.47%**	**76.22%**
Lexus	GX 470	92.56%	77.47%
Land Rover	Discovery	91.13%	74.97%
Land Rover	LR3	90.38%	77.23%
Infiniti	QX4	89.67%	76.57%
Land Rover	Range Rover Sport	90.69%	76.27%
Lincoln	Aviator	89.14%	75.47%
Mercury	Mountaineer	92.28%	77.97%
Subaru	B9 Tribeca	89.18%	75.12%
GMC	Envoy	89.61%	74.41%
Buick	Rainier	91.06%	74.34%
Saab	9-7X	90.02%	76.91%
Hummer	H3	88.84%	76.58%
	Total Upper Mid-Range SUV	**90.38%**	**76.11%**
Acura	NSX	91.11%	74.52%
M-Benz	SC 430	90.03%	74.20%
Cadillac	XLR	89.13%	76.73%
Jaguar	XK	89.06%	76.45%
Porsche	911 Carrera 4	92.52%	76.49%
Porsche	911 Carrera	91.74%	77.10%
M-Benz	SL Coupe/Roadster	90.13%	75.13%
M-Benz	CL class	92.17%	77.24%
BMW	6 Series	92.28%	75.81%
Lotus	Lotus	91.57%	74.33%
Dodge	Viper	88.70%	74.41%
	Total Upper Premium Sportscars	**90.77%**	**75.67%**
	Weighted Average	**97.40%**	**82.14%**

We've weighted the averages to balance to the high side to eliminate those vehicles with the lowest maintenance and technological advances in engine management.

When looking at the fuel cost over the lifetime of the individual models, an issue we had to contend with was how to treat gasoline taxes. In all there were more than 100 data points that needed to be considered ranging from tanker transport of oil to deep and shallow well maintenance (pro-rated for automotive use), infrastructure costs to the public for support industries including such items as refineries, gas stations and shipping transport vehicles mandatory inspections. This included the necessary infrastructure to perform such inspections that otherwise would not occur if it weren't for personal-use cars and trucks.

To help digest all of these considerations and data points, and to adjust for future oil and gasoline prices over the coming decades of life for individual models, we elected to show those data points as a single $3 per gallon cost in 2005 dollars. It is purely by happenstance that it reflects the current cost of a gallon of gasoline. Note that this too is an "industry" that generates and is the recipient of tax-based funding and has a potential to produce profits that are similarly outside of the auto industry, per se.

Example, the repair industry for over-the-road tanker trucks was included in the calculations as were government tax-based inspectors to assure safety and emission compliance for those trucks and the related repair industries.

Of ***today's*** $3 per gallon, about 41 cents goes to energy. Assuming gasoline rises on the back of limited supplies and inflation, $9.50 per gallon gasoline in 10 years is not out of the realm of possibilities. Under that scenario, it would require more than $3.70 per gallon in energy to drill, transport, refine and distribute gasoline. And those figures will continue to climb over the lifetime of existing vehicles of approximately 20 years.

Thus the use of $3 per gallon for the sake of this report.

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Division	Model	Lifetime Blend FE	Gallons Used	TTl E Cost Fuel $3/ga
Kia	Rio	27.77	5,832.94	$ 17,498.82
Hyundai	Accent	27.62	5,466.17	$ 16,398.50
Chevrolet	Aveo	28.83	4,924.78	$ 14,774.34
Toyota	Echo	31.32	5,013.14	$ 15,039.43
	Total Budget Cars	**28.89**	**5,309.26**	**$ 15,927.77**
Chevrolet	Cobalt	25.96	6,509.34	$ 19,528.02
Toyota	Matrix **	25.69	6,305.18	$ 18,915.53
Mazda	Mazda3	25.11	6,531.45	$ 19,594.35
Nissan	Sentra	24.39	6,725.30	$ 20,175.91
Suzuki	Aerio	25.58	6,215.72	$ 18,647.15
Mitsubishi	Lancer	22.77	6,762.17	$ 20,286.51
Kia	Spectra	25.63	6,163.48	$ 18,490.43
Scion	tC	22.33	6,223.93	$ 18,671.80
Suzuki	Forenza	22.68	6,303.78	$ 18,911.34
Ford	Focus	24.90	6,787.60	$ 20,362.80
Mazda	Protégé	24.18	6,657.43	$ 19,972.28
Pontiac	Sunfire	26.02	6,034.70	$ 18,104.09
Chevrolet	Cavalier	26.56	5,722.10	$ 17,166.30
Scion	xA	30.87	5,053.97	$ 15,161.92
Toyota	Corolla	30.00	5,632.64	$ 16,897.93
Dodge	Neon	25.06	5,905.51	$ 17,716.53
Hyundai	Elantra	26.02	6,225.22	$ 18,675.67
Saturn	Ion	26.86	5,994.52	$ 17,983.56
Ford	Escort	25.96	7,396.22	$ 22,188.65
Scion	xB	28.38	6,660.21	$ 19,980.64
	Total Economy Cars	**25.75**	**6,290.52**	**$ 18,871.57**
Nissan	Xterra	14.67	13,019.64	$ 39,058.91
Isuzu	Trooper	17.65	11,841.82	$ 35,525.47
Mazda	Mazda5	20.99	8,148.02	$ 24,444.06
Isuzu	Rodeo	16.49	11,159.35	$ 33,478.05
Suzuki	XL-7	16.04	10,283.93	$ 30,851.80
Suzuki	Grand Vitara	16.92	10,104.14	$ 30,312.41
Kia	Sorento	16.00	8,935.05	$ 26,805.15
Chevrolet	Blazer	14.77	14,151.51	$ 42,454.52
Suzuki	Vitara	16.88	9,357.97	$ 28,073.92
Isuzu	Rodeo Sport	16.46	9,843.30	$ 29,529.89
Kia	Sportage	18.35	8,663.94	$ 25,991.82
Jeep	Liberty	20.04	9,430.31	$ 28,290.94
Chevrolet	Tracker	19.31	7,924.37	$ 23,773.10
Jeep	Wrangler	14.97	13,830.32	$ 41,490.95
	Ttl Entry Level SUVs	**17.11**	**10,478.12**	**$ 31,434.36**
Mitsubishi	Outlander	19.52	9,374.90	$ 28,124.71

Hyundai	Tucson	18.94	7,707.96	$	23,123.87
Mazda	Tribute	19.22	7,960.59	$	23,881.77
Hyundai	Santa Fe	16.33	9,244.88	$	27,734.65
Pontiac	Torrent	17.41	9,306.03	$	27,918.09
Ford	Escape	18.96	8,491.36	$	25,474.07
Mercury	Mariner	19.28	7,833.16	$	23,499.49
Toyota	RAV4	19.65	8,242.40	$	24,727.19
Saturn	Vue	21.19	7,599.18	$	22,797.53
Chevrolet	Equinox	19.72	9,585.85	$	28,757.55
Honda	Element	20.72	6,851.76	$	20,555.28
Pontiac	Aztek	18.03	9,315.46	$	27,946.38
Honda	CR-V	21.05	7,412.35	$	22,237.05
	Ttl Entry Level Sportwagons	**19.23**	**8,378.91**	**$**	**25,136.74**
Nissan	Titan	12.90	13,099.71	$	39,299.14
Toyota	Tundra	13.87	13,772.50	$	41,317.51
Dodge	Ram pickup	15.18	15,214.87	$	45,644.60
Chevrolet	Silverado	14.78	16,168.00	$	48,504.01
GMC	Sierra	14.67	15,809.68	$	47,429.05
Ford	F Series	12.25	21,884.08	$	65,652.23
	Ttl Full Size Pickup	**13.94**	**15,991.47**	**$**	**47,974.42**
GMC	Savana/G Van	12.46	21,829.56	$	65,488.67
Ford	Econoline/Club Wagon	12.16	21,213.71	$	63,641.13
GMC	Express/G Van	13.44	18,825.34	$	56,476.02
Dodge	Sprinter Van	14.72	25,883.77	$	77,651.30
Dodge	Ram Van	11.99	18,937.12	$	56,811.36
Ford	Econoline van	12.71	22,107.02	$	66,321.07
	Full Size Van	**12.91**	**21,466.09**	**$**	**64,398.26**
Honda	Accord Hybrid	27.46	4,260.39	$	12,781.16
Toyota	Prius	40.12	2,716.78	$	8,150.34
Honda	Civic Hybrid	39.41	2,867.24	$	8,601.72
Ford	Escape Hybrid	28.86	4,886.22	$	14,658.66
Mercury	Mariner Hybrid	27.48	5,021.20	$	15,063.59
Honda	Insight	46.68	2,334.81	$	7,004.43
Lexus	RX 400h	23.88	8,040.63	$	24,121.90
Toyota	Highlander Hybrid	25.06	5,587.34	$	16,762.02
	Ttl Hybrids	**32.37**	**4,464.33**	**$**	**13,392.98**
Volkswagen	Phaeton	11.34	21,260.46	$	63,781.38
Audi	allroad quattro	14.91	13,548.68	$	40,646.03
Audi	A6	17.08	11,064.47	$	33,193.42
Lexus	LS 430	17.51	12,736.69	$	38,210.06
Lexus	GS 430	16.81	10,769.23	$	32,307.70
Infiniti	Q45	16.33	12,308.40	$	36,925.20
Jaguar	S-Type	16.13	10,230.91	$	30,692.73
Infiniti	M45	16.51	7,632.89	$	22,898.68
Lexus	GS 300	16.44	7,966.01	$	23,898.02
Cadillac	DTS	17.54	10,831.84	$	32,495.52

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Cadillac	DeVille	16.36	12,409.67	$	37,229.00
M-Benz	E class	15.12	16,927.59	$	50,782.77
Cadillac	Seville	13.19	12,279.01	$	36,837.02
Volvo	80 series	16.13	12,519.44	$	37,558.32
Cadillac	STS	17.69	12,210.76	$	36,632.27
BMW	5 Series	18.80	11,011.82	$	33,035.45
Acura	RL	17.85	9,190.07	$	27,570.20
Lincoln	Town Car	15.12	14,488.57	$	43,465.72
BMW	M3	15.66	9,134.00	$	27,402.01
	Total Luxury Car	**16.13**	**12,027.39**	**$**	**36,082.18**
Volkswagen	Golf	36.81	4,102.47	$	12,307.42
Volkswagen	Golf GTI	19.84	7,259.58	$	21,778.75
Saturn	L series	20.79	7,890.06	$	23,670.17
Honda	Civic	23.36	7,618.38	$	22,855.13
Chevrolet	HHR	19.97	8,462.40	$	25,387.19
Pontiac	G6	22.89	6,945.30	$	20,835.90
Chevrolet	Classic	25.22	9,080.38	$	27,241.15
Subaru	Impreza	19.17	7,146.85	$	21,440.55
Pontiac	Grand Am	20.44	9,393.51	$	28,180.52
Ford	Fusion	23.50	8,171.46	$	24,514.37
Mercury	Milan	23.19	8,150.98	$	24,452.93
Dodge	Stratus	22.93	8,766.31	$	26,298.94
Kia	Optima	25.68	6,269.49	$	18,808.46
Hyundai	Sonata	24.06	6,733.35	$	20,200.04
Suzuki	Verona	21.53	7,058.39	$	21,175.17
Volkswagen	Beetle	23.08	7,409.62	$	22,228.87
Pontiac	Vibe	27.20	5,918.82	$	17,756.47
Chevrolet	Malibu	24.72	6,592.94	$	19,778.82
Chrysler	PT Cruiser	20.54	9,345.63	$	28,036.88
Chrysler	Sebring	21.62	7,586.99	$	22,760.96
	Ttl Lower Mid-Range Cars	**23.33**	**7,495.14**	**$**	**22,485.43**
Nissan	Pathfinder	15.15	10,427.06	$	31,281.18
Toyota	4Runner	15.87	11,091.68	$	33,275.03
Mitsubishi	Montero	14.01	11,203.87	$	33,611.60
Mitsubishi	Montero Sport	14.47	9,814.61	$	29,443.84
Isuzu	Axiom	16.04	8,851.05	$	26,553.14
Land Rover	Freelander	16.68	9,470.78	$	28,412.34
Isuzu	Ascender	14.39	11,185.68	$	33,557.05
Jeep	Commander	15.06	13,812.18	$	41,436.54
Jeep	Grand Cherokee	14.32	14,589.89	$	43,769.68
Jeep	Grand Cherokee SRT-8	11.55	15,760.78	$	47,282.35
Dodge	Durango	14.15	13,005.03	$	39,015.09
Ford	Explorer	14.34	14,152.23	$	42,456.70
Chevrolet	TrailBlazer	15.66	11,937.76	$	35,813.27
	Ttl Lower Mid-Range SUV	**14.75**	**11,946.35**	**$**	**35,839.06**
Toyota	Sequoia	13.22	13,241.72	$	39,725.17
Nissan	Armada	11.54	14,035.73	$	42,107.18

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Ford	Excursion	11.77	22,852.15	$	68,556.46
Chevrolet	Suburban	14.30	19,025.64	$	57,076.91
GMC	Yukon XL	13.98	19,381.41	$	58,144.22
Ford	Expedition	12.81	22,172.76	$	66,518.28
Chevrolet	Tahoe	15.61	17,173.04	$	51,519.13
GMC	Yukon	15.51	17,089.31	$	51,267.92
	Total Large SUV	**13.59**	**18,121.47**	**$**	**54,364.41**
Chrysler	Pacifica	18.04	10,142.26	$	30,426.78
Nissan	Murano	20.80	8,559.04	$	25,677.13
Toyota	Highlander	20.84	7,484.94	$	22,454.82
Ford	Freestyle/Windstar	17.19	11,984.83	$	35,954.48
Buick	Rendezvous	22.13	7,590.81	$	22,772.43
Honda	Pilot	17.95	8,693.23	$	26,079.68
Mitsubishi	Endeavor	20.10	7,612.34	$	22,837.03
	Total Mid-Range Sportwagons	**19.58**	**8,866.78**	**$**	**26,600.34**
Volkswagen	EuroVan/T4	17.73	8,967.52	$	26,902.56
Honda	Odyssey	18.93	10,141.63	$	30,424.89
Pontiac	Montana SV6	17.18	9,663.94	$	28,991.81
Chrysler	Town & Country	19.71	8,676.35	$	26,029.06
Buick	Terraza	16.74	10,692.46	$	32,077.37
Dodge	Caravan/Grand Caravan	19.36	8,472.73	$	25,418.19
Toyota	Sienna	21.57	7,326.54	$	21,979.61
Chevrolet	Venture	15.62	11,074.71	$	33,224.14
Saturn	Relay	18.59	8,714.76	$	26,144.27
Pontiac	Montana	20.56	8,074.60	$	24,223.80
Nissan	Quest	21.58	7,412.87	$	22,238.62
Chevrolet	Uplander	16.11	9,685.12	$	29,055.35
Ford	Freestar	17.21	9,355.17	$	28,065.50
Mercury	Monterey	17.91	8,876.39	$	26,629.17
Kia	Sedona	15.60	8,847.79	$	26,543.36
Mazda	MPV	18.64	8,367.11	$	25,101.34
GMC	Safari	16.69	12,100.32	$	36,300.96
Chevrolet	Astro	15.57	13,168.22	$	39,504.65
	Total Minivans	**18.07**	**9,423.23**	**$**	**28,269.70**
Volvo	70 series	16.04	11,536.11	$	34,608.33
Volvo	60 series	16.05	10,033.93	$	30,101.79
Mercury	Zephyr	20.13	8,890.88	$	26,672.63
Acura	TL	22.52	7,592.57	$	22,777.70
Acura	CL	22.86	7,959.93	$	23,879.79
Lincoln	LS	19.66	7,934.12	$	23,802.37
Jaguar	X-Type	19.93	8,480.10	$	25,440.31
Lexus	ES 330	19.61	8,771.33	$	26,314.00
Lexus	IS 300	21.98	7,370.30	$	22,110.91
Infiniti	G35	21.57	7,972.43	$	23,917.29
M-Benz	C class	20.46	8,357.30	$	25,071.90
Cadillac	CTS	20.62	7,758.84	$	23,276.52
BMW	330.00	19.61	8,976.03	$	26,928.09

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Buick	Park Avenue	20.14	8,888.89	$	26,666.67
BMW	325.00	18.97	9,012.65	$	27,037.95
Saab	9-5	20.49	7,906.50	$	23,719.50
	Total Near Luxury Cars	**20.04**	**8,590.12**	**$**	**25,770.36**
Audi	A8	16.57	12,912.15	$	38,736.46
M-Benz	S class	14.38	17,452.99	$	52,358.97
Maserati	Maserati	10.94	14,813.35	$	44,440.06
BMW	7 Series	19.19	10,472.61	$	31,417.82
Jaguar	XJ	21.02	7,706.93	$	23,120.78
	Total Premium Cars	**16.42**	**12,671.61**	**$**	**38,014.82**
Mercury	Montego	19.68	7,721.72	$	23,165.15
Buick	LaCrosse	21.50	7,673.90	$	23,021.70
Volkswagen	Passat	23.71	8,096.82	$	24,290.46
Dodge	Magnum	20.08	9,114.85	$	27,344.56
Ford	Five Hundred	19.69	8,735.89	$	26,207.67
Dodge	Charger	21.09	8,155.32	$	24,465.95
Nissan	Maxima	23.17	8,330.23	$	24,990.68
Chrysler	300/300M	17.62	10,894.99	$	32,684.97
Mitsubishi	Diamante	20.53	7,353.84	$	22,061.51
Volvo	40 series	22.61	7,164.78	$	21,494.33
Infiniti	I30/I35	23.00	8,175.51	$	24,526.53
Mazda	Millenia	21.51	6,322.39	$	18,967.17
Audi	A4/S4	16.16	10,456.66	$	31,369.98
Audi	S4	16.65	10,267.53	$	30,802.60
Acura	TSX	24.46	6,908.45	$	20,725.35
Saab	9-3	21.59	8,430.49	$	25,291.47
Saab	9-2	19.79	8,641.45	$	25,924.36
Buick	Regal	20.94	7,259.20	$	21,777.60
	Total Premium Mid-Range Cars	**20.77**	**8,316.89**	**$**	**24,950.67**
M-Benz	SLK class	17.84	8,912.40	$	26,737.19
M-Benz	CLS class	19.82	11,955.74	$	35,867.21
M-Benz	CLK class	16.87	11,318.62	$	33,955.86
Porsche	Boxster	18.72	8,385.84	$	25,157.53
Chevrolet	Corvette	20.23	8,006.11	$	24,018.34
Audi	TT	23.17	6,084.74	$	18,254.22
BMW	Z8	17.50	10,114.93	$	30,344.80
BMW	Z4	23.80	6,177.30	$	18,531.89
Ford	Thunderbird	18.26	9,365.16	$	28,095.47
Chrysler	Crossfire	17.32	7,564.42	$	22,693.27
	Total Premium Sporty Cars	**19.35**	**8,788.53**	**$**	**26,365.58**
Porsche	Cayenne	14.49	13,320.69	$	39,962.07
Volkswagen	Touareg	15.92	11,683.62	$	35,050.85
Land Rover	Range Rover	12.24	16,825.62	$	50,476.86
M-Benz	G class	11.07	21,410.83	$	64,232.48
Hummer	H1	12.04	31,490.05	$	94,470.16
Lexus	LX 470	12.57	16,947.24	$	50,841.71

Cadillac	Escalade ESV	15.37	15,223.28	$	45,669.85
Toyota	Land Cruiser	12.64	23,804.75	$	71,414.24
Hummer	H2	14.91	13,211.34	$	39,634.02
Cadillac	Escalade	15.75	15,173.81	$	45,521.42
Lincoln	Navigator	12.61	15,939.46	$	47,818.37
	Total Premium SUV	**13.60**	**17,730.06**	**$**	**53,190.18**
Volvo	XC90	18.43	12,425.73	$	37,277.20
Lexus	RX330	19.39	9,901.08	$	29,703.24
Infiniti	FX35	15.36	11,265.49	$	33,796.47
Infiniti	FX45	13.62	12,996.36	$	38,989.07
M-Benz	R class	15.35	10,681.83	$	32,045.48
Volvo	50 series	22.83	6,834.11	$	20,502.34
Acura	MDX	18.80	10,374.23	$	31,122.68
Cadillac	SRX	16.44	10,401.98	$	31,205.95
M-Benz	M class	13.70	15,689.96	$	47,069.87
BMW	X5	15.70	10,571.42	$	31,714.25
BMW	X3	18.25	9,148.51	$	27,445.52
	Total Premium Sportwagons	**17.08**	**10,935.52**	**$**	**32,806.55**
Honda	Accord	22.49	9,291.97	$	27,875.90
Volkswagen	Jetta wagon	21.72	6,262.40	$	18,787.20
Volkswagen	Jetta	25.48	5,180.37	$	15,541.10
Toyota	Camry	24.80	7,985.08	$	23,955.23
Subaru	Baja	20.70	7,585.42	$	22,756.26
Subaru	Legacy	23.49	6,642.50	$	19,927.49
Subaru	Forester	19.54	8,446.09	$	25,338.27
Subaru	Outback	20.79	7,599.94	$	22,799.82
Mazda	Mazda6	24.59	6,588.11	$	19,764.32
Dodge	Intrepid	17.53	10,156.00	$	30,467.99
Chevrolet	Monte Carlo	20.83	9,072.14	$	27,216.41
Mitsubishi	Galant	22.74	6,727.84	$	20,183.51
Pontiac	Grand Prix	20.80	7,740.88	$	23,222.63
Buick	Century	21.58	8,063.64	$	24,190.93
Mercury	Sable	21.65	9,285.74	$	27,857.22
Ford	Taurus	20.66	9,971.90	$	29,915.69
Mazda	626.00	19.11	8,946.43	$	26,839.29
Nissan	Altima	23.22	6,588.60	$	19,765.80
Chevrolet	Impala	20.87	8,337.14	$	25,011.43
Hyundai	XG350	22.08	6,838.43	$	20,515.30
Kia	Amanti	19.21	8,434.86	$	25,304.59
	Total Small Rid-Range Cars	**21.61**	**7,892.64**	**$**	**23,677.92**
Chevrolet	SSR	12.39	11,539.68	$	34,619.05
Honda	Ridgeline	14.83	10,992.95	$	32,978.86
GMC	Canyon	17.50	10,742.92	$	32,228.76
GMC	Sonoma	17.25	10,843.53	$	32,530.59
Nissan	Frontier	16.27	10,512.56	$	31,537.67
Toyota	Tacoma	20.73	8,345.68	$	25,037.05
Chevrolet	Colorado	16.56	11,110.63	$	33,331.88

Mitsubishi	Raider	15.53	11,271.71	$	33,815.13
Mazda	B-Series	13.41	14,390.13	$	43,170.38
Dodge	Dakota	15.86	10,847.46	$	32,542.39
Ford	Ranger	17.23	10,910.52	$	32,731.55
Chevrolet	S10	20.24	8,500.12	$	25,500.37
	Total Small Pickup	**16.48**	**10,833.99**	**$**	**32,501.97**
Cadillac	Escalade EXT	12.89	17,148.51	$	51,445.52
Chevrolet	Avalanche	11.64	20,108.74	$	60,326.23
Lincoln	Mark LT	13.14	14,607.56	$	43,822.68
	Total Specialty Utility Pickup	**12.56**	**17,288.27**	**$**	**51,864.81**
Mazda	RX8	17.75	7,831.22	$	23,493.65
Nissan	350Z	21.05	7,412.22	$	22,236.65
Audi	A3	23.94	5,805.83	$	17,417.50
Mitsubishi	Eclipse Spyder	22.03	5,400.63	$	16,201.88
Mitsubishi	Eclipse	22.02	6,539.29	$	19,617.86
Pontiac	GTO	16.83	8,674.66	$	26,023.99
Toyota	Celica	25.51	5,449.44	$	16,348.33
Mini	Mini Cooper S	23.85	6,750.32	$	20,250.97
Acura	RSX	24.94	6,376.00	$	19,128.00
Pontiac	Solstice	21.83	7,009.74	$	21,029.23
Mini	Mini Cooper	26.96	6,269.03	$	18,807.10
Ford	Mustang	19.85	9,116.55	$	27,349.65
Toyota	MR2 Spyder	24.28	6,672.90	$	20,018.69
Mazda	MX-5 Miata	21.07	8,637.82	$	25,913.45
Honda	S2000	18.27	8,867.59	$	26,602.78
Hyundai	Tiburon	22.58	8,501.74	$	25,505.21
Pontiac	Firebird	17.05	10,144.96	$	30,434.88
Chevrolet	Camaro	16.54	10,822.56	$	32,467.68
	Total Touring	**21.46**	**7,571.25**	**$**	**22,713.75**
Toyota	Avalon	23.59	8,519.18	$	25,557.53
Buick	Lucerne	21.90	8,084.00	$	24,252.01
Pontiac	Bonneville	17.02	10,751.25	$	32,253.74
Chrysler	Concorde	18.14	10,089.52	$	30,268.55
Mercury	Grand Marquis	21.73	9,524.64	$	28,573.91
Ford	Crown Victoria	20.51	10,337.73	$	31,013.18
Buick	LeSabre	20.65	8,863.51	$	26,590.52
	Total Traditional Car	**20.50**	**9,452.83**	**$**	**28,358.49**
Maybach	Maybach	10.15	25,317.29	$	75,951.86
Rolls-Royce	Rolls-Royce	10.52	25,961.99	$	77,885.97
Bentley	Bentley	11.17	24,257.98	$	72,773.95
Porsche	Carrera GT	9.90	18,779.28	$	56,337.84
Lamborghini	Lamborghini	8.96	13,510.49	$	40,531.46
Ferrar	Ferrari	8.74	13,615.10	$	40,845.31
Ford	GT	12.57	9,228.79	$	27,686.36
Aston Martin	Aston Martin	12.51	12,466.29	$	37,398.86
	Total Ultra Luxury	**10.57**	**17,892.15**	**$**	**53,676.45**

Lexus	GX 470	14.67	12,064.10	$	36,192.30
Land Rover	Discovery	14.81	13,704.27	$	41,112.81
Land Rover	LR3	13.20	16,815.52	$	50,446.55
Infiniti	QX4	14.29	10,568.15	$	31,704.45
Land Rover	Range Rover Sport	13.97	14,744.93	$	44,234.78
Lincoln	Aviator	12.44	15,357.81	$	46,073.43
Mercury	Mountaineer	14.05	12,168.22	$	36,504.66
Subaru	B9 Tribeca	16.03	9,167.90	$	27,503.71
GMC	Envoy	14.43	13,995.61	$	41,986.84
Buick	Rainier	18.05	9,752.21	$	29,256.62
Saab	9-7X	15.84	9,029.01	$	27,087.02
Hummer	H3	16.01	12,926.45	$	38,779.36
	Total Upper Mid-Range SUV	**14.82**	**12,524.51**	**$**	**37,573.54**
Acura	NSX	16.11	11,914.45	$	35,743.35
M-Benz	SC 430	17.70	9,320.24	$	27,960.71
Cadillac	XLR	16.31	10,057.60	$	30,172.79
Jaguar	XK	16.55	11,359.43	$	34,078.30
Porsche	911 Carrera 4	13.09	11,533.92	$	34,601.76
Porsche	911 Carrera	10.93	15,000.70	$	45,002.09
M-Benz	SL Coupe/Roadster	13.53	12,492.37	$	37,477.10
M-Benz	CL class	20.21	9,304.28	$	27,912.85
BMW	6 Series	16.00	10,815.18	$	32,445.54
Lotus	Lotus	21.45	5,641.22	$	16,923.66
Dodge	Viper	12.02	9,820.77	$	29,462.30
	Total Upper Premium Sportscars	**15.81**	**10,660.01**	**$**	**31,980.04**
	Industry Weighted Average	**20.37**	**11,183.53**	**$**	**33,550.60**

NOTE: We are NOT talking about the cost of gasoline to the driver. We are discussing the lifetime energy cost to produce and maintain the infrastructure for a gasoline-based power plant that happens to be in a car or truck.

Clearly this is the point where hybrids are most efficient. For example, the lifetime fuel-related energy cost for a Prius is barely $8,000 while the most economical Budget Segment car – Kia Rio – is more than twice that amount.

With that higher fuel economy comes less pollution both from the tailpipe and gasoline manufacturing/blending facilities as well as the necessary support industries**. Regulatory agencies still must maintain facilities and technicians and equipment whether the vehicle gets 50 mpg or 10 mpg.**

When taken on a lifetime-energy cost for fuel basis broken down by miles of probably life, however, there are some interesting dynamics that come into play.

For example, the fueling energy support and gasoline-used matrix shows budget cars at roughly 10.4 cents per mile of life. (Again, this is not the cost of gasoline. It is the energy needed to support that gasoline.)

Hybrids, which currently have a somewhat lower life expectancy than conventional models for reasons already stated, have an energy cost per mile of 10.1 cent per mile over their lifetimes. The Prius is the lowest at 7.5 cents and the Lexus RX400h highest at 12 cents.

Below is a table sorted from lowest to highest lifetime fuel energy requirements. It unquestionably shows that the current crop of hybrids have a lower impact on society’s energy demands once in the hands of consumers. But, again, this is only a small part of the overall picture.

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Division	Model	TTL Fuel E Per Mile
Kia	Rio	$ 0.108
Hyundai	Accent	$ 0.109
Chevrolet	Aveo	$ 0.104
Toyota	Echo	$ 0.096
	Total Budget Cars	**$ 0.104**
Chevrolet	Cobalt	$ 0.116
Toyota	Matrix **	$ 0.117
Mazda	Mazda3	$ 0.119
Nissan	Sentra	$ 0.123
Suzuki	Aerio	$ 0.117
Mitsubishi	Lancer	$ 0.132
Kia	Spectra	$ 0.117
Scion	tC	$ 0.134
Suzuki	Forenza	$ 0.132
Ford	Focus	$ 0.120
Mazda	Protégé	$ 0.124
Pontiac	Sunfire	$ 0.115
Chevrolet	Cavalier	$ 0.113
Scion	xA	$ 0.097
Toyota	Corolla	$ 0.100
Dodge	Neon	$ 0.120
Hyundai	Elantra	$ 0.115
Saturn	Ion	$ 0.112
Ford	Escort	$ 0.116
Scion	xB	$ 0.106
	Total Economy Cars	**$ 0.117**
Nissan	Xterra	$ 0.204
Isuzu	Trooper	$ 0.170
Mazda	Mazda5	$ 0.143
Isuzu	Rodeo	$ 0.182
Suzuki	XL-7	$ 0.187
Suzuki	Grand Vitara	$ 0.177
Kia	Sorento	$ 0.187
Chevrolet	Blazer	$ 0.203
Suzuki	Vitara	$ 0.178
Isuzu	Rodeo Sport	$ 0.182
Kia	Sportage	$ 0.163
Jeep	Liberty	$ 0.150
Chevrolet	Tracker	$ 0.155
Jeep	Wrangler	$ 0.200
	Ttl Entry Level SUVs	**$ 0.178**
Mitsubishi	Outlander	$ 0.154

Hyundai	Tucson	$ 0.158
Mazda	Tribute	$ 0.156
Hyundai	Santa Fe	$ 0.184
Pontiac	Torrent	$ 0.172
Ford	Escape	$ 0.158
Mercury	Mariner	$ 0.156
Toyota	RAV4	$ 0.153
Saturn	Vue	$ 0.142
Chevrolet	Equinox	$ 0.152
Honda	Element	$ 0.145
Pontiac	Aztek	$ 0.166
Honda	CR-V	$ 0.143
	Ttl Entry Level Sportwagons	**$ 0.157**
Nissan	Titan	$ 0.233
Toyota	Tundra	$ 0.216
Dodge	Ram pickup	$ 0.198
Chevrolet	Silverado	$ 0.203
GMC	Sierra	$ 0.204
Ford	F Series	$ 0.245
	Ttl Full Size Pickup	**$ 0.216**
GMC	Savana/G Van	$ 0.241
Ford	Econoline/Club Wagon	$ 0.247
GMC	Express/G Van	$ 0.223
Dodge	Sprinter Van	$ 0.204
Dodge	Ram Van	$ 0.250
Ford	Econoline van	$ 0.236
	Full Size Van	**$ 0.231**
Honda	Accord Hybrid	$ 0.109
Toyota	Prius	$ 0.075
Honda	Civic Hybrid	$ 0.076
Ford	Escape Hybrid	$ 0.104
Mercury	Mariner Hybrid	$ 0.109
Honda	Insight	$ 0.064
Lexus	RX 400h	$ 0.126
Toyota	Highlander Hybrid	$ 0.120
	Ttl Hybrids	**$ 0.101**
Volkswagen	Phaeton	$ 0.265
Audi	allroad quattro	$ 0.201
Audi	A6	$ 0.176
Lexus	LS 430	$ 0.171
Lexus	GS 430	$ 0.178
Infiniti	Q45	$ 0.184
Jaguar	S-Type	$ 0.186
Infiniti	M45	$ 0.182
Lexus	GS 300	$ 0.182
Cadillac	DTS	$ 0.171

Cadillac	DeVille	$ 0.183
M-Benz	E class	$ 0.198
Cadillac	Seville	$ 0.227
Volvo	80 series	$ 0.186
Cadillac	STS	$ 0.170
BMW	5 Series	$ 0.160
Acura	RL	$ 0.168
Lincoln	Town Car	$ 0.198
BMW	M3	$ 0.192
	Total Luxury Car	**$ 0.189**
Volkswagen	Golf	$ 0.082
Volkswagen	Golf GTI	$ 0.151
Saturn	L series	$ 0.144
Honda	Civic	$ 0.128
Chevrolet	HHR	$ 0.150
Pontiac	G6	$ 0.131
Chevrolet	Classic	$ 0.119
Subaru	Impreza	$ 0.157
Pontiac	Grand Am	$ 0.147
Ford	Fusion	$ 0.128
Mercury	Milan	$ 0.129
Dodge	Stratus	$ 0.131
Kia	Optima	$ 0.117
Hyundai	Sonata	$ 0.125
Suzuki	Verona	$ 0.139
Volkswagen	Beetle	$ 0.130
Pontiac	Vibe	$ 0.110
Chevrolet	Malibu	$ 0.121
Chrysler	PT Cruiser	$ 0.146
Chrysler	Sebring	$ 0.139
	Ttl Lower Mid-Range Cars	**$ 0.131**
Nissan	Pathfinder	$ 0.198
Toyota	4Runner	$ 0.189
Mitsubishi	Montero	$ 0.214
Mitsubishi	Montero Sport	$ 0.207
Isuzu	Axiom	$ 0.187
Land Rover	Freelander	$ 0.180
Isuzu	Ascender	$ 0.208
Jeep	Commander	$ 0.199
Jeep	Grand Cherokee	$ 0.209
Jeep	Grand Cherokee SRT-8	$ 0.260
Dodge	Durango	$ 0.212
Ford	Explorer	$ 0.209
Chevrolet	TrailBlazer	$ 0.192
	Ttl Lower Mid-Range SUV	**$ 0.206**
Toyota	Sequoia	$ 0.227
Nissan	Armada	$ 0.260

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Ford	Excursion	$ 0.255
Chevrolet	Suburban	$ 0.210
GMC	Yukon XL	$ 0.215
Ford	Expedition	$ 0.234
Chevrolet	Tahoe	$ 0.192
GMC	Yukon	$ 0.193
	Total Large SUV	**$ 0.221**
Chrysler	Pacifica	$ 0.166
Nissan	Murano	$ 0.144
Toyota	Highlander	$ 0.144
Ford	Freestyle/Windstar	$ 0.175
Buick	Rendezvous	$ 0.136
Honda	Pilot	$ 0.167
Mitsubishi	Endeavor	$ 0.149
	Total Mid-Range Sportwagons	**$ 0.155**
Volkswagen	EuroVan/T4	$ 0.169
Honda	Odyssey	$ 0.158
Pontiac	Montana SV6	$ 0.175
Chrysler	Town & Country	$ 0.152
Buick	Terraza	$ 0.179
Dodge	Caravan/Grand Caravan	$ 0.155
Toyota	Sienna	$ 0.139
Chevrolet	Venture	$ 0.192
Saturn	Relay	$ 0.161
Pontiac	Montana	$ 0.146
Nissan	Quest	$ 0.139
Chevrolet	Uplander	$ 0.186
Ford	Freestar	$ 0.174
Mercury	Monterey	$ 0.167
Kia	Sedona	$ 0.192
Mazda	MPV	$ 0.161
GMC	Safari	$ 0.180
Chevrolet	Astro	$ 0.193
	Total Minivans	**$ 0.168**
Volvo	70 series	$ 0.187
Volvo	60 series	$ 0.187
Mercury	Zephyr	$ 0.149
Acura	TL	$ 0.133
Acura	CL	$ 0.131
Lincoln	LS	$ 0.153
Jaguar	X-Type	$ 0.151
Lexus	ES 330	$ 0.153
Lexus	IS 300	$ 0.136
Infiniti	G35	$ 0.139
M-Benz	C class	$ 0.147
Cadillac	CTS	$ 0.145
BMW	330	$ 0.153

Buick	Park Avenue	$ 0.149
BMW	325	$ 0.158
Saab	9-5	$ 0.146
	Total Near Luxury Cars	**$ 0.151**
Audi	A8	$ 0.181
M-Benz	S class	$ 0.209
Maserati	Maserati	$ 0.274
BMW	7 Series	$ 0.156
Jaguar	XJ	$ 0.143
	Total Premium Cars	**$ 0.192**
Mercury	Montego	$ 0.152
Buick	LaCrosse	$ 0.140
Volkswagen	Passat	$ 0.127
Dodge	Magnum	$ 0.149
Ford	Five Hundred	$ 0.152
Dodge	Charger	$ 0.142
Nissan	Maxima	$ 0.129
Chrysler	300/300M	$ 0.170
Mitsubishi	Diamante	$ 0.146
Volvo	40 series	$ 0.133
Infiniti	I30/I35	$ 0.130
Mazda	Millenia	$ 0.139
Audi	A4/S4	$ 0.186
Audi	S4	$ 0.180
Acura	TSX	$ 0.123
Saab	9-3	$ 0.139
Saab	9-2	$ 0.152
Buick	Regal	$ 0.143
	Total Premium Mid-Range Cars	**$ 0.146**
M-Benz	SLK class	$ 0.168
M-Benz	CLS class	$ 0.151
M-Benz	CLK class	$ 0.178
Porsche	Boxster	$ 0.160
Chevrolet	Corvette	$ 0.148
Audi	TT	$ 0.129
BMW	Z8	$ 0.171
BMW	Z4	$ 0.126
Ford	Thunderbird	$ 0.164
Chrysler	Crossfire	$ 0.173
	Total Premium Sporty Cars	**$ 0.158**
Porsche	Cayenne	$ 0.207
Volkswagen	Touareg	$ 0.188
Land Rover	Range Rover	$ 0.245
M-Benz	G class	$ 0.271
Hummer	H1	$ 0.249
Lexus	LX 470	$ 0.239

Cadillac	Escalade ESV	$ 0.195
Toyota	Land Cruiser	$ 0.237
Hummer	H2	$ 0.201
Cadillac	Escalade	$ 0.190
Lincoln	Navigator	$ 0.238
	Total Premium SUV	**$ 0.226**
Volvo	XC90	$ 0.163
Lexus	RX330	$ 0.155
Infiniti	FX35	$ 0.195
Infiniti	FX45	$ 0.220
M-Benz	R class	$ 0.195
Volvo	50 series	$ 0.131
Acura	MDX	$ 0.160
Cadillac	SRX	$ 0.182
M-Benz	M class	$ 0.219
BMW	X5	$ 0.191
BMW	X3	$ 0.164
	Total Premium Sportwagons	**$ 0.180**
Honda	Accord	$ 0.133
Volkswagen	Jetta wagon	$ 0.138
Volkswagen	Jetta	$ 0.118
Toyota	Camry	$ 0.121
Subaru	Baja	$ 0.145
Subaru	Legacy	$ 0.128
Subaru	Forester	$ 0.154
Subaru	Outback	$ 0.144
Mazda	Mazda6	$ 0.122
Dodge	Intrepid	$ 0.171
Chevrolet	Monte Carlo	$ 0.144
Mitsubishi	Galant	$ 0.132
Pontiac	Grand Prix	$ 0.144
Buick	Century	$ 0.139
Mercury	Sable	$ 0.139
Ford	Taurus	$ 0.145
Mazda	626	$ 0.157
Nissan	Altima	$ 0.129
Chevrolet	Impala	$ 0.144
Hyundai	XG350	$ 0.136
Kia	Amanti	$ 0.156
	Total Small Rid-Range Cars	**$ 0.140**
Chevrolet	SSR	$ 0.242
Honda	Ridgeline	$ 0.202
GMC	Canyon	$ 0.171
GMC	Sonoma	$ 0.174
Nissan	Frontier	$ 0.184
Toyota	Tacoma	$ 0.145
Chevrolet	Colorado	$ 0.181

Mitsubishi	Raider	$ 0.193
Mazda	B-Series	$ 0.224
Dodge	Dakota	$ 0.189
Ford	Ranger	$ 0.174
Chevrolet	S10	$ 0.148
	Total Small Pickup	**$ 0.185**
Cadillac	Escalade EXT	$ 0.233
Chevrolet	Avalanche	$ 0.258
Lincoln	Mark LT	$ 0.228
	Total Specialty Utility Pickup	**$ 0.240**
Mazda	RX8	$ 0.169
Nissan	350Z	$ 0.143
Audi	A3	$ 0.125
Mitsubishi	Eclipse Spyder	$ 0.136
Mitsubishi	Eclipse	$ 0.136
Pontiac	GTO	$ 0.178
Toyota	Celica	$ 0.118
Mini	Mini Cooper S	$ 0.126
Acura	RSX	$ 0.120
Pontiac	Solstice	$ 0.137
Mini	Mini Cooper	$ 0.111
Ford	Mustang	$ 0.151
Toyota	MR2 Spyder	$ 0.124
Mazda	MX-5 Miata	$ 0.142
Honda	S2000	$ 0.164
Hyundai	Tiburon	$ 0.133
Pontiac	Firebird	$ 0.176
Chevrolet	Camaro	$ 0.181
	Total Touring	**$ 0.143**
Toyota	Avalon	$ 0.127
Buick	Lucerne	$ 0.137
Pontiac	Bonneville	$ 0.176
Chrysler	Concorde	$ 0.165
Mercury	Grand Marquis	$ 0.138
Ford	Crown Victoria	$ 0.146
Buick	LeSabre	$ 0.145
	Total Traditional Car	**$ 0.147**
Maybach	Maybach	$ 0.296
Rolls-Royce	Rolls-Royce	$ 0.285
Bentley	Bentley	$ 0.269
Porsche	Carrera GT	$ 0.303
Lamborghini	Lamborghini	$ 0.335
Ferrar	Ferrari	$ 0.343
Ford	GT	$ 0.239
Aston Martin	Aston Martin	$ 0.240
	Total Ultra Luxury	**$ 0.286**

Lexus	GX 470	$ 0.204
Land Rover	Discovery	$ 0.203
Land Rover	LR3	$ 0.227
Infiniti	QX4	$ 0.210
Land Rover	Range Rover Sport	$ 0.215
Lincoln	Aviator	$ 0.241
Mercury	Mountaineer	$ 0.213
Subaru	B9 Tribeca	$ 0.187
GMC	Envoy	$ 0.208
Buick	Rainier	$ 0.166
Saab	9-7X	$ 0.189
Hummer	H3	$ 0.187
	Total Upper Mid-Range SUV	**$ 0.205**
Acura	NSX	$ 0.186
M-Benz	SC 430	$ 0.169
Cadillac	XLR	$ 0.184
Jaguar	XK	$ 0.181
Porsche	911 Carrera 4	$ 0.229
Porsche	911 Carrera	$ 0.274
M-Benz	SL Coupe/Roadster	$ 0.222
M-Benz	CL class	$ 0.148
BMW	6 Series	$ 0.188
Lotus	Lotus	$ 0.140
Dodge	Viper	$ 0.250
	Total Upper Premium Sportscars	**$ 0.196**

The following table shows the total fuel-related energy cost on a per mile basis. We've kept the segment data within the table for the sake of positioning and comparison. These "Total (segment)" lines have no relationship to the models listed above or below the specific segment sum other than as a place holder.

Division	Model	TTL Fuel E Per Mile
Honda	Insight	$0.0643
Toyota	Prius	$0.0748
Honda	Civic Hybrid	$0.0761
Volkswagen	Golf	$0.0815
Toyota	Echo	$0.0958
Scion	xA	$0.0972
Toyota	Corolla	$0.1000
	Ttl Hybrids	**$0.1012**
Ford	Escape Hybrid	$0.1040
Chevrolet	Aveo	$0.1040
	Total Budget Cars	**$0.1041**
Scion	xB	$0.1057
Kia	Rio	$0.1080
Hyundai	Accent	$0.1086
Mercury	Mariner Hybrid	$0.1092
Honda	Accord Hybrid	$0.1092
Pontiac	Vibe	$0.1103
Mini	Mini Cooper	$0.1113
Saturn	Ion	$0.1117
Chevrolet	Cavalier	$0.1129
Hyundai	Elantra	$0.1153
Pontiac	Sunfire	$0.1153
Chevrolet	Cobalt	$0.1156
Ford	Escort	$0.1156
Toyota	Matrix **	$0.1168
Kia	Optima	$0.1168
	Total Economy Cars	**$0.1169**
Kia	Spectra	$0.1170
Suzuki	Aerio	$0.1173
Toyota	Celica	$0.1176
Volkswagen	Jetta	$0.1177
Chevrolet	Classic	$0.1190
Mazda	Mazda3	$0.1195
Dodge	Neon	$0.1197
Toyota	Highlander Hybrid	$0.1197
Acura	RSX	$0.1203
Ford	Focus	$0.1205
Toyota	Camry	$0.1210
Chevrolet	Malibu	$0.1213
Mazda	Mazda6	$0.1220
Acura	TSX	$0.1226
Nissan	Sentra	$0.1230
Toyota	MR2 Spyder	$0.1236
Mazda	Protégé	$0.1241
Hyundai	Sonata	$0.1247

Audi	A3	$0.1253
Lexus	RX 400h	$0.1256
Mini	Mini Cooper S	$0.1258
BMW	Z4	$0.1261
Volkswagen	Passat	$0.1265
Toyota	Avalon	$0.1272
Ford	Fusion	$0.1277
Subaru	Legacy	$0.1277
Honda	Civic	$0.1284
Nissan	Altima	$0.1292
Mercury	Milan	$0.1294
Audi	TT	$0.1295
Nissan	Maxima	$0.1295
Volkswagen	Beetle	$0.1300
Infiniti	I30/I35	$0.1305
Dodge	Stratus	$0.1308
Pontiac	G6	$0.1310
	Ttl Lower Mid-Range Cars	**$0.1311**
Acura	CL	$0.1312
Volvo	50 series	$0.1314
Mitsubishi	Lancer	$0.1317
Mitsubishi	Galant	$0.1319
Suzuki	Forenza	$0.1322
Volvo	40 series	$0.1327
Hyundai	Tiburon	$0.1328
Acura	TL	$0.1332
Honda	Accord	$0.1334
Scion	tC	$0.1343
Buick	Rendezvous	$0.1356
Hyundai	XG350	$0.1359
Mitsubishi	Eclipse Spyder	$0.1362
Mitsubishi	Eclipse	$0.1362
Lexus	IS 300	$0.1365
Buick	Lucerne	$0.1370
Pontiac	Solstice	$0.1374
Mercury	Grand Marquis	$0.1380
Volkswagen	Jetta wagon	$0.1381
Mercury	Sable	$0.1386
Chrysler	Sebring	$0.1388
Saab	9-3	$0.1390
Nissan	Quest	$0.1390
Buick	Century	$0.1390
Infiniti	G35	$0.1391
Toyota	Sienna	$0.1391
Suzuki	Verona	$0.1393
Mazda	Millenia	$0.1395
Buick	LaCrosse	$0.1395
Lotus	Lotus	$0.1399
	Total Small Rid-Range Cars	**$0.1402**
Saturn	Vue	$0.1416

Dodge	Charger	$0.1422
Mazda	MX-5 Miata	$0.1424
Nissan	350Z	$0.1425
Honda	CR-V	$0.1425
Jaguar	XJ	$0.1427
Mazda	Mazda5	$0.1429
	Total Touring	**$0.1432**
Buick	Regal	$0.1433
Chevrolet	Impala	$0.1437
Toyota	Highlander	$0.1439
Chevrolet	Monte Carlo	$0.1440
Pontiac	Grand Prix	$0.1442
Nissan	Murano	$0.1443
Subaru	Outback	$0.1443
Saturn	L series	$0.1443
Toyota	Tacoma	$0.1447
Honda	Element	$0.1448
Subaru	Baja	$0.1449
Ford	Taurus	$0.1452
Buick	LeSabre	$0.1453
Cadillac	CTS	$0.1455
Pontiac	Montana	$0.1459
Chrysler	PT Cruiser	$0.1460
Mitsubishi	Diamante	$0.1461
	Total Premium Mid-Range Cars	**$0.1462**
Ford	Crown Victoria	$0.1463
Saab	9-5	$0.1464
M-Benz	C class	$0.1466
Pontiac	Grand Am	$0.1468
	Total Traditional Car	**$0.1475**
Chevrolet	S10	$0.1483
Chevrolet	Corvette	$0.1483
M-Benz	CL class	$0.1485
Buick	Park Avenue	$0.1490
Mercury	Zephyr	$0.1490
Mitsubishi	Endeavor	$0.1493
Dodge	Magnum	$0.1494
Jeep	Liberty	$0.1497
Chevrolet	HHR	$0.1502
Jaguar	X-Type	$0.1505
Ford	Mustang	$0.1511
	Total Near Luxury Cars	**$0.1511**
Volkswagen	Golf GTI	$0.1512
M-Benz	CLS class	$0.1513
Saab	9-2	$0.1516
Chevrolet	Equinox	$0.1522
Chrysler	Town & Country	$0.1522
Ford	Five Hundred	$0.1524
Mercury	Montego	$0.1524
Lincoln	LS	$0.1526

Toyota	RAV4	$0.1526
Lexus	ES 330	$0.1530
BMW	330	$0.1530
Subaru	Forester	$0.1536
Mitsubishi	Outlander	$0.1537
Lexus	RX330	$0.1547
Dodge	Caravan/Grand Caravan	$0.1550
	Total Mid-Range Sportwagons	**$0.1552**
Chevrolet	Tracker	$0.1554
Mercury	Mariner	$0.1556
Mazda	Tribute	$0.1561
Kia	Amanti	$0.1562
BMW	7 Series	$0.1563
Subaru	Impreza	$0.1565
	Ttl Entry Level Sportwagons	**$0.1567**
Mazda	626	$0.1570
	Total Premium Sporty Cars	**$0.1576**
BMW	325	$0.1581
Ford	Escape	$0.1582
Hyundai	Tucson	$0.1584
Honda	Odyssey	$0.1585
BMW	5 Series	$0.1596
Acura	MDX	$0.1596
Porsche	Boxster	$0.1602
Mazda	MPV	$0.1609
Saturn	Relay	$0.1614
Volvo	XC90	$0.1628
Kia	Sportage	$0.1635
Honda	S2000	$0.1642
Ford	Thunderbird	$0.1643
BMW	X3	$0.1643
Chrysler	Concorde	$0.1654
Buick	Rainier	$0.1662
Chrysler	Pacifica	$0.1663
Pontiac	Aztek	$0.1663
Honda	Pilot	$0.1672
Mercury	Monterey	$0.1675
	Total Minivans	**$0.1681**
Acura	RL	$0.1681
M-Benz	SLK class	$0.1682
Mazda	RX8	$0.1690
Volkswagen	EuroVan/T4	$0.1692
M-Benz	SC 430	$0.1695
Cadillac	STS	$0.1696
Isuzu	Trooper	$0.1700
Chrysler	300/300M	$0.1702
Cadillac	DTS	$0.1710
Dodge	Intrepid	$0.1712
Lexus	LS 430	$0.1713
GMC	Canyon	$0.1714

BMW	Z8	$0.1714
Pontiac	Torrent	$0.1723
Chrysler	Crossfire	$0.1732
GMC	Sonoma	$0.1740
Ford	Ranger	$0.1741
Ford	Freestar	$0.1743
Ford	Freestyle/Windstar	$0.1745
Pontiac	Montana SV6	$0.1746
Audi	A6	$0.1756
Pontiac	Firebird	$0.1759
Pontiac	Bonneville	$0.1762
Suzuki	Grand Vitara	$0.1773
Suzuki	Vitara	$0.1777
M-Benz	CLK class	$0.1778
	Ttl Entry Level SUVs	**$0.1781**
Pontiac	GTO	$0.1782
Lexus	GS 430	$0.1785
Buick	Terraza	$0.1792
GMC	Safari	$0.1797
Land Rover	Freelander	$0.1798
	Total Premium Sportwagons	**$0.1800**
Audi	S4	$0.1801
Audi	A8	$0.1810
Chevrolet	Colorado	$0.1812
Jaguar	XK	$0.1813
Chevrolet	Camaro	$0.1814
Infiniti	M45	$0.1817
Isuzu	Rodeo	$0.1819
Isuzu	Rodeo Sport	$0.1823
Lexus	GS 300	$0.1824
Cadillac	SRX	$0.1825
Cadillac	DeVille	$0.1834
Hyundai	Santa Fe	$0.1837
Infiniti	Q45	$0.1837
Cadillac	XLR	$0.1840
Nissan	Frontier	$0.1844
	Total Small Pickup	**$0.1849**
Audi	A4/S4	$0.1856
Volvo	80 series	$0.1859
Jaguar	S-Type	$0.1860
Acura	NSX	$0.1862
Chevrolet	Uplander	$0.1863
Volvo	60 series	$0.1870
Suzuki	XL-7	$0.1870
Isuzu	Axiom	$0.1870
Volvo	70 series	$0.1871
Subaru	B9 Tribeca	$0.1871
Hummer	H3	$0.1873
Kia	Sorento	$0.1874
BMW	6 Series	$0.1875

Volkswagen	Touareg	$0.1884
Toyota	4Runner	$0.1891
Dodge	Dakota	$0.1892
	Total Luxury Car	**$0.1893**
Saab	9-7X	$0.1894
Cadillac	Escalade	$0.1905
BMW	X5	$0.1910
Chevrolet	TrailBlazer	$0.1915
BMW	M3	$0.1916
	Total Premium Cars	**$0.1920**
Chevrolet	Venture	$0.1920
Chevrolet	Tahoe	$0.1922
Kia	Sedona	$0.1923
Chevrolet	Astro	$0.1927
Mitsubishi	Raider	$0.1932
GMC	Yukon	$0.1935
Cadillac	Escalade ESV	$0.1952
Infiniti	FX35	$0.1954
M-Benz	R class	$0.1954
	Total Upper Premium Sportscars	**$0.1962**
Dodge	Ram pickup	$0.1976
Nissan	Pathfinder	$0.1980
M-Benz	E class	$0.1984
Lincoln	Town Car	$0.1985
Jeep	Commander	$0.1992
Jeep	Wrangler	$0.2004
Hummer	H2	$0.2012
Audi	allroad quattro	$0.2012
Honda	Ridgeline	$0.2023
Land Rover	Discovery	$0.2025
Chevrolet	Silverado	$0.2029
Chevrolet	Blazer	$0.2031
Dodge	Sprinter Van	$0.2038
GMC	Sierra	$0.2044
Lexus	GX 470	$0.2045
Nissan	Xterra	$0.2045
	Total Upper Mid-Range SUV	**$0.2053**
	Ttl Lower Mid-Range SUV	**$0.2055**
Porsche	Cayenne	$0.2071
Mitsubishi	Montero Sport	$0.2074
GMC	Envoy	$0.2079
Isuzu	Ascender	$0.2084
M-Benz	S class	$0.2086
Ford	Explorer	$0.2091
Jeep	Grand Cherokee	$0.2094
Chevrolet	Suburban	$0.2098
Infiniti	QX4	$0.2100
Dodge	Durango	$0.2120
Mercury	Mountaineer	$0.2135
Mitsubishi	Montero	$0.2141

GMC	Yukon XL	$0.2146
Land Rover	Range Rover Sport	$0.2147
Toyota	Tundra	$0.2163
	Ttl Full Size Pickup	**$0.2164**
M-Benz	M class	$0.2189
Infiniti	FX45	$0.2203
	Total Large SUV	**$0.2212**
M-Benz	SL Coupe/Roadster	$0.2218
GMC	Express/G Van	$0.2232
Mazda	B-Series	$0.2237
	Total Premium SUV	**$0.2263**
Toyota	Sequoia	$0.2270
Land Rover	LR3	$0.2272
Cadillac	Seville	$0.2274
Lincoln	Mark LT	$0.2282
Porsche	911 Carrera 4	$0.2292
	Full Size Van	**$0.2311**
Nissan	Titan	$0.2325
Cadillac	Escalade EXT	$0.2328
Ford	Expedition	$0.2342
Ford	Econoline van	$0.2360
Toyota	Land Cruiser	$0.2373
Lincoln	Navigator	$0.2379
Ford	GT	$0.2387
Lexus	LX 470	$0.2387
Aston Martin	Aston Martin	$0.2397
	Total Specialty Utility Pickup	**$0.2405**
GMC	Savana/G Van	$0.2408
Lincoln	Aviator	$0.2412
Chevrolet	SSR	$0.2421
Ford	F Series	$0.2450
Land Rover	Range Rover	$0.2450
Ford	Econoline/Club Wagon	$0.2467
Hummer	H1	$0.2493
Dodge	Viper	$0.2497
Dodge	Ram Van	$0.2503
Ford	Excursion	$0.2549
Chevrolet	Avalanche	$0.2578
Jeep	Grand Cherokee SRT-8	$0.2598
Nissan	Armada	$0.2599
Volkswagen	Phaeton	$0.2647
Bentley	Bentley	$0.2685
M-Benz	G class	$0.2710
Maserati	Maserati	$0.2743
Porsche	911 Carrera	$0.2744
Rolls-Royce	Rolls-Royce	$0.2853
	Total Ultra Luxury	**$0.2865**
Maybach	Maybach	$0.2955
Porsche	Carrera GT	$0.3029
Lamborghini	Lamborghini	$0.3350

Ferrari	Ferrari	$0.3432

Clearly from the above data the type of vehicle, with the exception of high-line sport scars, offers a consumer a wide variety of choices across many categories if that person is interested in energy efficiency. While certain hybrids are excellent energy savers over their lifetime, there are some ICE models that are better than other hybrids. Scion xB, for example, and Honda Civic ICE are less impactful on society's energy consumption than a Highlander or Accord hybrid. The VW Golf is virtually the same as a Prius.

And again this is only measures the fuel efficiency portion of the vehicle's total energy requirements.

CHAPTER FOUR – Lifetime Repair and Maintenance

Over the course of a vehicle's life, repair and maintenance plays an important role in the overall energy demands for both ownership of that vehicle and society in general.

In the course of investigating the by-model data, we had to look at everything from oil changes to warranty work; from tire replacements to spark-plug manufacturing. In all, more than 700 data points are included just in the repair and maintenance portion of the research.

A simple example: All vehicles eventually need replacement tires. Over the lifetime of each vehicle, the energy cost to produce, transport and support the tire-replacement industry costs in excess of $72 per tire including disposal and recycling; pollution management at plants to employee commutes. (This is an industry straight average and does not include a sales-weighting. With sales weighting, the cost is closer to $48. We did not sales weight this data because there is no guarantee the same vehicles would be sold in the same proportion over the coming 15 years. Good economic times generates more high-content vehicles and vice versa, for example.)

Considerations for the following data include the typical tire replacement type as well as the original equipment tires fitted; driving habits for the vehicle (such as towing, heavy loads, use on job sites, highway vs. city driving, likelihood of regular tire maintenance, frequent tire rotations, vehicle owners' replacement before worn vs. replacement only after wear bars become visible, etc.); support industries (tire stores and outlets, tire transport to retailers and the like); materials manufacturing (from steel to the dies necessary for embossing); and literally scores of other information.

For simplicities sake we have condensed the data to reflect both current and time-line increases in the costs of these tires (and other information under the repair/maintenance columns).

Note that the tire data below is PART OF the repair/maintenance section as a breakout for example purposes only. It only includes the cost of new and replacement tire production, not disposal which is covered under the recyclable chapter.

Dust to Dust Energy Report -- Automotive

Division	Model	Lifetime Tire Repl. E Cost Per Tire	Lifetime Tire Repl. Miles to Repl	Lifetime # of Tires Required	Tire Energy Cost Per Tire
Kia	Rio	$ 36.62	41,602	16.74	$ 2.19
Hyundai	Accent	$ 37.21	42,875	15.14	$ 2.46
Chevrolet	Aveo	$ 30.52	43,399	14.07	$ 2.17
Toyota	Echo	$ 33.06	44,052	15.33	$ 2.16
	Total Budget Cars	**$ 34.35**	**42,982.00**	**15.32**	**$ 2.24**
Chevrolet	Cobalt	$ 39.85	41,647	17.45	$ 2.28
Toyota	Matrix **	$ 36.49	42,172	16.52	$ 2.21
Mazda	Mazda3	$ 37.20	41,664	16.93	$ 2.20
Nissan	Sentra	$ 41.20	42,239	16.70	$ 2.47
Suzuki	Aerio	$ 33.57	44,034	15.53	$ 2.16
Mitsubishi	Lancer	$ 31.96	44,251	14.96	$ 2.14
Kia	Spectra	$ 34.85	43,222	15.72	$ 2.22
Scion	tC	$ 30.22	42,499	14.06	$ 2.15
Suzuki	Forenza	$ 35.45	41,608	14.78	$ 2.40
Ford	Focus	$ 40.68	44,325	16.39	$ 2.48
Mazda	Protégé	$ 37.95	41,370	16.73	$ 2.27
Pontiac	Sunfire	$ 37.04	44,341	15.23	$ 2.43
Chevrolet	Cavalier	$ 34.24	44,060	14.83	$ 2.31
Scion	xA	$ 36.55	42,684	15.72	$ 2.33
Toyota	Corolla	$ 37.05	43,914	16.55	$ 2.24
Dodge	Neon	$ 34.21	43,703	14.56	$ 2.35
Hyundai	Elantra	$ 40.52	42,442	16.41	$ 2.47
Saturn	Ion	$ 36.24	42,413	16.32	$ 2.22
Ford	Escort	$ 43.27	42,474	19.44	$ 2.23
Scion	xB	$ 46.08	43,387	18.73	$ 2.46
	Total Economy Cars	**$ 37.23**	**42,922.45**	**16.18**	**$ 2.30**
Nissan	Xterra	$ 56.79	47,421	17.32	$ 3.28
Isuzu	Trooper	$ 61.84	49,748	18.07	$ 3.42
Mazda	Mazda5	$ 46.01	52,142	14.10	$ 3.26
Isuzu	Rodeo	$ 55.51	48,407	16.34	$ 3.40
Suzuki	XL-7	$ 45.13	51,189	13.86	$ 3.26
Suzuki	Grand Vitara	$ 44.65	53,634	13.71	$ 3.26
Kia	Sorento	$ 36.09	54,044	11.38	$ 3.17
Chevrolet	Blazer	$ 56.51	52,290	17.19	$ 3.29
Suzuki	Vitara	$ 43.61	52,282	12.99	$ 3.36
Isuzu	Rodeo Sport	$ 47.97	50,371	13.83	$ 3.47
Kia	Sportage	$ 46.21	49,207	13.89	$ 3.33
Jeep	Liberty	$ 53.74	49,722	16.34	$ 3.29
Chevrolet	Tracker	$ 44.88	48,093	13.68	$ 3.28
Jeep	Wrangler	$ 64.41	47,181	18.87	$ 3.41
	Ttl Entry Level SUVs	**$ 50.24**	**50,409.36**	**15.11**	**$ 3.32**

Dust to Dust Energy Report -- Automotive

Mitsubishi	Outlander	$	57.96	46,700	16.85	$	3.44
Hyundai	Tucson	$	40.74	53,949	11.64	$	3.50
Mazda	Tribute	$	43.15	54,452	12.08	$	3.57
Hyundai	Santa Fe	$	48.68	46,801	13.87	$	3.51
Pontiac	Torrent	$	44.64	53,945	12.91	$	3.46
Ford	Escape	$	48.92	51,966	13.32	$	3.67
Mercury	Mariner	$	50.56	47,841	13.57	$	3.73
Toyota	RAV4	$	47.06	53,078	13.12	$	3.59
Saturn	Vue	$	47.73	51,697	13.39	$	3.56
Chevrolet	Equinox	$	58.92	48,165	16.87	$	3.49
Honda	Element	$	47.45	46,685	13.08	$	3.63
Pontiac	Aztek	$	51.31	49,927	14.47	$	3.55
Honda	CR-V	$	46.04	50,606	13.26	$	3.47
	Ttl Entry Level Sportwagons	**$**	**48.70**	**50,447.08**	**13.73**	**$**	**3.55**
Nissan	Titan	$	62.30	42,682	17.03	$	3.66
Toyota	Tundra	$	69.16	44,043	18.65	$	3.71
Dodge	Ram pickup	$	86.09	42,437	23.41	$	3.68
Chevrolet	Silverado	$	89.99	43,867	23.43	$	3.84
GMC	Sierra	$	86.76	44,026	22.66	$	3.83
Ford	F Series	$	109.65	41,660	27.66	$	3.96
	Ttl Full Size Pickup	**$**	**83.99**	**43,119.17**	**22.14**	**$**	**3.78**
GMC	Savana/G Van	$	101.96	42,008	27.84	$	3.66
Ford	Econoline/Club Wagon	$	104.56	41,411	26.79	$	3.90
GMC	Express/G Van	$	98.68	43,027	25.28	$	3.90
Dodge	Sprinter Van	$	147.21	41,244	39.72	$	3.71
Dodge	Ram Van	$	84.79	43,847	22.26	$	3.81
Ford	Econoline van	$	111.97	43,069	28.05	$	3.99
	Full Size Van	**$**	**108.20**	**42,434.33**	**28.33**	**$**	**3.83**
Honda	Accord Hybrid	$	37.07	46,821	10.75	$	3.45
Toyota	Prius	$	38.90	44,135	10.62	$	3.66
Honda	Civic Hybrid	$	35.81	46,219	10.51	$	3.41
Ford	Escape Hybrid	$	56.06	40,134	15.11	$	3.71
Mercury	Mariner Hybrid	$	45.40	43,707	13.58	$	3.34
Honda	Insight	$	41.84	41,067	11.41	$	3.67
Lexus	RX 400h	$	60.24	45,772	18.04	$	3.34
Toyota	Highlander Hybrid	$	57.33	39,815	15.12	$	3.79
	Ttl Hybrids	**$**	**46.58**	**43,458.75**	**13.14**	**$**	**3.55**
Volkswagen	Phaeton	$	119.00	40,791	25.41	$	4.68
Audi	allroad quattro	$	94.90	41,335	21.01	$	4.52
Audi	A6	$	83.99	42,732	19.02	$	4.42
Lexus	LS 430	$	99.45	42,704	22.45	$	4.43
Lexus	GS 430	$	81.54	41,590	18.71	$	4.36
Infiniti	Q45	$	88.41	43,886	19.69	$	4.49
Jaguar	S-Type	$	76.80	41,935	16.92	$	4.54
Infiniti	M45	$	58.04	44,170	12.27	$	4.73

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Lexus	GS 300	$	59.28	42,117	13.37	$	4.43
Cadillac	DTS	$	90.67	42,575	19.19	$	4.73
Cadillac	DeVille	$	88.26	43,271	20.17	$	4.38
M-Benz	E class	$	113.29	44,114	24.95	$	4.54
Cadillac	Seville	$	72.86	42,651	16.33	$	4.46
Volvo	80 series	$	93.93	43,483	19.98	$	4.70
Cadillac	STS	$	99.46	40,547	22.91	$	4.34
BMW	5 Series	$	101.42	41,010	21.70	$	4.67
Acura	RL	$	80.09	41,922	16.82	$	4.76
Lincoln	Town Car	$	103.41	40,962	22.99	$	4.50
BMW	M3	$	65.74	42,288	14.54	$	4.52
	Total Luxury Car	**$**	**87.92**	**42,320.16**	**19.39**	**$**	**4.54**
Volkswagen	Golf	$	57.61	36,936	17.58	$	3.28
Volkswagen	Golf GTI	$	53.53	37,476	16.52	$	3.24
Saturn	L series	$	67.35	33,161	21.27	$	3.17
Honda	Civic	$	78.38	32,527	23.53	$	3.33
Chevrolet	HHR	$	68.71	35,125	20.69	$	3.32
Pontiac	G6	$	56.69	38,373	17.82	$	3.18
Chevrolet	Classic	$	76.39	39,587	24.87	$	3.07
Subaru	Impreza	$	57.72	32,260	18.26	$	3.16
Pontiac	Grand Am	$	86.08	32,282	25.57	$	3.37
Ford	Fusion	$	80.75	31,430	26.27	$	3.07
Mercury	Milan	$	72.85	35,552	22.86	$	3.19
Dodge	Stratus	$	75.74	35,876	24.09	$	3.14
Kia	Optima	$	74.32	31,394	22.05	$	3.37
Hyundai	Sonata	$	58.34	36,597	19.03	$	3.07
Suzuki	Verona	$	53.02	39,647	16.49	$	3.22
Volkswagen	Beetle	$	62.21	39,729	18.51	$	3.36
Pontiac	Vibe	$	64.46	34,002	20.36	$	3.17
Chevrolet	Malibu	$	60.72	36,961	18.96	$	3.20
Chrysler	PT Cruiser	$	73.49	35,951	22.96	$	3.20
Chrysler	Sebring	$	61.26	35,583	19.82	$	3.09
	Ttl Lower Mid-Range Cars	**$**	**66.98**	**35,522.45**	**20.88**	**$**	**3.21**
Nissan	Pathfinder	$	58.30	38,354	17.71	$	3.29
Toyota	4Runner	$	60.81	39,191	19.31	$	3.15
Mitsubishi	Montero	$	63.00	36,584	18.45	$	3.41
Mitsubishi	Montero Sport	$	57.09	36,442	16.76	$	3.41
Isuzu	Axiom	$	53.09	37,758	16.17	$	3.28
Land Rover	Freelander	$	59.70	36,713	18.51	$	3.23
Isuzu	Ascender	$	60.33	37,017	18.70	$	3.23
Jeep	Commander	$	79.95	36,065	24.80	$	3.22
Jeep	Grand Cherokee	$	82.59	37,902	23.71	$	3.48
Jeep	Grand Cherokee SRT-8	$	69.28	36,757	21.29	$	3.25
Dodge	Durango	$	72.31	35,690	22.17	$	3.26
Ford	Explorer	$	75.54	38,712	22.55	$	3.35
Chevrolet	TrailBlazer	$	72.64	38,480	20.90	$	3.48
	Ttl Lower Mid-Range	**$**	**66.51**	**37,358.85**	**20.08**	**$**	**3.31**

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	SUV						
Toyota	Sequoia	$	53.29	52,272	14.40	$	3.70
Nissan	Armada	$	54.18	50,286	13.85	$	3.91
Ford	Excursion	$	99.18	42,489	27.22	$	3.64
Chevrolet	Suburban	$	87.22	47,834	24.45	$	3.57
GMC	Yukon XL	$	109.41	41,739	27.92	$	3.92
Ford	Expedition	$	94.01	46,726	26.14	$	3.60
Chevrolet	Tahoe	$	85.30	49,825	23.13	$	3.69
GMC	Yukon	$	104.85	42,233	26.98	$	3.89
	Total Large SUV	**$**	**85.93**	**46,675.50**	**23.01**	**$**	**3.74**
Chrysler	Pacifica	$	67.97	41,514	18.96	$	3.59
Nissan	Murano	$	64.41	42,828	17.87	$	3.60
Toyota	Highlander	$	53.64	42,895	15.64	$	3.43
Ford	Freestyle/Windstar	$	75.79	41,711	21.24	$	3.57
Buick	Rendezvous	$	62.76	40,842	17.69	$	3.55
Honda	Pilot	$	62.18	38,861	17.26	$	3.60
Mitsubishi	Endeavor	$	55.32	43,372	15.17	$	3.65
	Total Mid-Range Sportwagons	**$**	**63.15**	**41,717.57**	**17.69**	**$**	**3.57**
Volkswagen	EuroVan/T4	$	55.40	41,574	16.45	$	3.37
Honda	Odyssey	$	63.85	43,444	19.00	$	3.36
Pontiac	Montana SV6	$	61.11	40,216	17.75	$	3.44
Chrysler	Town & Country	$	67.13	38,261	19.22	$	3.49
Buick	Terraza	$	66.72	38,983	19.74	$	3.38
Dodge	Caravan/Grand Caravan	$	60.38	40,046	17.61	$	3.43
Toyota	Sienna	$	53.84	42,908	15.83	$	3.40
Chevrolet	Venture	$	65.49	38,949	19.10	$	3.43
Saturn	Relay	$	59.19	40,088	17.38	$	3.41
Pontiac	Montana	$	59.70	41,165	17.34	$	3.44
Nissan	Quest	$	54.27	41,202	16.70	$	3.25
Chevrolet	Uplander	$	53.12	43,323	15.48	$	3.43
Ford	Freestar	$	56.91	41,021	16.88	$	3.37
Mercury	Monterey	$	58.14	38,162	17.92	$	3.25
Kia	Sedona	$	51.44	39,799	14.91	$	3.45
Mazda	MPV	$	56.34	39,183	17.12	$	3.29
GMC	Safari	$	66.65	43,110	20.15	$	3.31
Chevrolet	Astro	$	68.61	43,991	20.04	$	3.42
	Total Minivans	**$**	**59.91**	**40,856.94**	**17.70**	**$**	**3.38**
Volvo	70 series	$	76.43	42,589	18.68	$	4.09
Volvo	60 series	$	63.33	45,802	15.12	$	4.19
Mercury	Zephyr	$	70.27	42,469	18.12	$	3.88
Acura	TL	$	70.45	41,271	17.82	$	3.95
Acura	CL	$	63.02	47,988	16.31	$	3.86
Lincoln	LS	$	63.71	42,903	15.64	$	4.08
Jaguar	X-Type	$	61.55	45,823	15.86	$	3.88
Lexus	ES 330	$	64.99	45,887	16.12	$	4.03

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Lexus	IS 300	$	56.73	49,395	14.10	$	4.02
Infiniti	G35	$	60.08	50,524	14.64	$	4.10
M-Benz	C class	$	63.91	47,461	15.49	$	4.13
Cadillac	CTS	$	54.50	51,589	13.34	$	4.09
BMW	330	$	63.83	44,757	16.91	$	3.78
Buick	Park Avenue	$	64.35	45,272	17.00	$	3.79
BMW	325	$	62.00	44,532	16.51	$	3.76
Saab	9-5	$	59.17	44,681	15.59	$	3.80
	Total Near Luxury Cars	**$**	**67.39**	**48,362.50**	**17.18**	**$**	**4.17**
Audi	A8	$	93.55	49,213	18.70	$	5.00
M-Benz	S class	$	108.68	51,107	21.12	$	5.15
Maserati	Maserati	$	61.35	54,596	12.76	$	4.81
BMW	7 Series	$	75.51	54,441	15.88	$	4.76
Jaguar	XJ	$	74.81	49,997	13.93	$	5.37
	Total Premium Cars	**$**	**82.78**	**51,870.80**	**16.48**	**$**	**5.02**
Mercury	Montego	$	54.00	51,735	12.63	$	4.27
Buick	LaCrosse	$	60.21	49,811	14.24	$	4.23
Volkswagen	Passat	$	75.07	45,300	18.23	$	4.12
Dodge	Magnum	$	63.06	48,903	16.09	$	3.92
Ford	Five Hundred	$	64.42	49,368	14.98	$	4.30
Dodge	Charger	$	61.51	50,022	14.79	$	4.16
Nissan	Maxima	$	73.12	44,230	18.76	$	3.90
Chrysler	300/300M	$	74.66	42,407	19.47	$	3.84
Mitsubishi	Diamante	$	57.72	49,781	13.04	$	4.43
Volvo	40 series	$	60.63	45,427	15.33	$	3.95
Infiniti	I30/I35	$	63.79	51,440	15.72	$	4.06
Mazda	Millenia	$	44.85	52,303	11.18	$	4.01
Audi	A4/S4	$	70.95	44,009	16.51	$	4.30
Audi	S4	$	72.32	42,256	17.40	$	4.16
Acura	TSX	$	60.30	48,157	15.09	$	4.00
Saab	9-3	$	75.49	41,551	18.83	$	4.01
Saab	9-2	$	66.56	43,173	17.03	$	3.91
Buick	Regal	$	54.79	46,498	14.06	$	3.90
	Total Premium Mid-Range Cars	**$**	**64.08**	**47,020.61**	**15.74**	**$**	**4.08**
M-Benz	SLK class	$	67.59	51,416	13.30	$	5.08
M-Benz	CLS class	$	103.44	50,017	20.38	$	5.08
M-Benz	CLK class	$	88.37	47,722	17.21	$	5.14
Porsche	Boxster	$	71.57	46,161	14.62	$	4.89
Chevrolet	Corvette	$	70.10	51,513	13.52	$	5.18
Audi	TT	$	65.75	48,318	12.55	$	5.24
BMW	Z8	$	84.91	47,425	16.05	$	5.29
BMW	Z4	$	59.58	53,290	11.86	$	5.02
Ford	Thunderbird	$	78.21	51,410	14.30	$	5.47
Chrysler	Crossfire	$	56.38	47,799	11.78	$	4.78
	Total Premium Sporty Cars	**$**	**74.59**	**49,507.10**	**14.56**	**$**	**5.12**

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Porsche	Cayenne	$	93.18	44,800	18.52	$	5.03
Volkswagen	Touareg	$	98.60	41,839	19.12	$	5.16
Land Rover	Range Rover	$	111.27	41,549	21.32	$	5.22
M-Benz	G class	$	125.29	44,421	22.94	$	5.46
Hummer	H1	$	222.89	41,216	39.54	$	5.64
Lexus	LX 470	$	112.26	41,415	22.12	$	5.08
Cadillac	Escalade ESV	$	121.74	41,152	24.45	$	4.98
Toyota	Land Cruiser	$	155.00	44,055	29.38	$	5.28
Hummer	H2	$	105.49	41,918	20.21	$	5.22
Cadillac	Escalade	$	120.40	44,710	22.99	$	5.24
Lincoln	Navigator	$	102.60	43,823	19.72	$	5.20
	Total Premium SUV	$	9.10	44,971	1.62	$	5.63
		$	**114.82**	**42,989.08**	**21.83**	**$**	**5.26**
Volvo	XC90	$	101.69	46,381	21.23	$	4.79
Lexus	RX330	$	95.65	43,106	19.15	$	4.99
Infiniti	FX35	$	77.18	45,088	16.50	$	4.68
Infiniti	FX45	$	84.40	44,186	17.22	$	4.90
M-Benz	R class	$	78.94	44,312	15.91	$	4.96
Volvo	50 series	$	77.45	43,843	15.30	$	5.06
Acura	MDX	$	87.38	44,323	18.92	$	4.62
Cadillac	SRX	$	88.60	43,296	16.98	$	5.22
M-Benz	M class	$	94.27	44,495	20.78	$	4.54
BMW	X5	$	68.50	47,349	15.08	$	4.54
BMW	X3	$	78.24	43,073	16.67	$	4.69
	Total Premium Sportwagons	**$**	**84.76**	**44,495.64**	**17.61**	**$**	**4.82**
Honda	Accord	$	73.24	52,099	17.25	$	4.25
Volkswagen	Jetta wagon	$	51.84	48,710	12.01	$	4.32
Volkswagen	Jetta	$	44.99	49,048	11.57	$	3.89
Toyota	Camry	$	70.07	49,442	17.22	$	4.07
Subaru	Baja	$	63.69	43,364	15.57	$	4.09
Subaru	Legacy	$	56.75	51,798	12.95	$	4.38
Subaru	Forester	$	66.86	44,527	15.93	$	4.20
Subaru	Outback	$	60.95	45,213	15.03	$	4.06
Mazda	Mazda6	$	68.37	42,174	16.52	$	4.14
Dodge	Intrepid	$	78.74	41,566	18.41	$	4.28
Chevrolet	Monte Carlo	$	66.13	48,085	16.90	$	3.91
Mitsubishi	Galant	$	62.04	42,194	15.59	$	3.98
Pontiac	Grand Prix	$	55.00	49,389	14.02	$	3.92
Buick	Century	$	60.00	51,847	14.43	$	4.16
Mercury	Sable	$	66.27	51,541	16.77	$	3.95
Ford	Taurus	$	87.55	43,485	20.37	$	4.30
Mazda	626	$	56.33	52,361	14.04	$	4.01
Nissan	Altima	$	54.02	47,827	13.76	$	3.93
Chevrolet	Impala	$	64.22	47,114	15.88	$	4.04
Hyundai	XG350	$	51.91	52,083	12.47	$	4.16
Kia	Amanti	$	54.50	51,029	13.65	$	3.99
	Total Small Rid-	**$**	**62.55**	**47,852.19**	**15.25**	**$**	**4.10**

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Range Cars

Chevrolet	SSR	$	75.99	40,135	15.32	$	4.96
Honda	Ridgeline	$	70.25	40,595	17.27	$	4.07
GMC	Canyon	$	81.83	38,874	20.80	$	3.94
GMC	Sonoma	$	81.27	40,219	19.99	$	4.07
Nissan	Frontier	$	74.83	36,436	20.18	$	3.71
Toyota	Tacoma	$	71.16	38,043	19.55	$	3.64
Chevrolet	Colorado	$	75.53	40,024	19.77	$	3.82
Mitsubishi	Raider	$	72.73	40,753	18.46	$	3.94
Mazda	B-Series	$	88.83	37,755	21.98	$	4.04
Dodge	Dakota	$	71.89	37,499	19.72	$	3.65
Ford	Ranger	$	73.92	40,157	20.13	$	3.67
Chevrolet	S10	$	73.52	37,835	19.55	$	3.76
	Total Small Pickup	**$**	**75.98**	**39,027.08**	**19.39**	**$**	**3.94**
Cadillac	Escalade EXT	$	107.37	49,274	19.29	$	5.57
Chevrolet	Avalanche	$	110.26	47,133	21.35	$	5.17
Lincoln	Mark LT	$	93.50	45,941	17.97	$	5.20
	Total Specialty Utility Pickup	**$**	**103.71**	**47,449.33**	**19.54**	**$**	**5.31**
Mazda	RX8	$	69.41	49,524	12.07	$	5.75
Nissan	350Z	$	107.50	34,850	19.25	$	5.59
Audi	A3	$	89.11	37,341	16.01	$	5.57
Mitsubishi	Eclipse Spyder	$	78.40	37,870	13.51	$	5.80
Mitsubishi	Eclipse	$	95.70	35,264	17.56	$	5.45
Pontiac	GTO	$	93.14	37,186	16.88	$	5.52
Toyota	Celica	$	87.33	37,935	15.76	$	5.54
Mini	Mini Cooper S	$	118.90	34,062	20.32	$	5.85
Acura	RSX	$	99.60	38,154	17.92	$	5.56
Pontiac	Solstice	$	101.88	36,823	17.87	$	5.70
Mini	Mini Cooper	$	109.79	36,981	19.65	$	5.59
Ford	Mustang	$	117.34	36,042	21.59	$	5.43
Toyota	MR2 Spyder	$	106.54	37,177	18.74	$	5.69
Mazda	MX-5 Miata	$	123.72	36,955	21.18	$	5.84
Honda	S2000	$	106.38	36,303	19.19	$	5.54
Hyundai	Tiburon	$	123.59	37,790	21.85	$	5.66
Pontiac	Firebird	$	108.50	37,619	19.77	$	5.49
Chevrolet	Camaro	$	117.30	37,468	20.54	$	5.71
	Total Touring	**$**	**103.01**	**37,519.11**	**18.31**	**$**	**5.63**
Toyota	Avalon	$	58.29	51,792	16.69	$	3.49
Buick	Lucerne	$	55.97	48,020	15.85	$	3.53
Pontiac	Bonneville	$	54.06	49,823	15.79	$	3.42
Chrysler	Concorde	$	58.42	45,176	17.42	$	3.35
Mercury	Grand Marquis	$	72.58	42,822	20.79	$	3.49
Ford	Crown Victoria	$	72.42	43,492	20.96	$	3.46
Buick	LeSabre	$	62.83	43,107	18.25	$	3.44
	Total Traditional Car	**$**	**62.08**	**46,318.86**	**17.96**	**$**	**3.46**

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Maybach	Maybach	$	164.85	43,809	25.23	$	6.54
Rolls-Royce	Rolls-Royce	$	160.29	45,288	25.92	$	6.18
Bentley	Bentley	$	237.44	31,719	36.74	$	6.46
Porsche	Carrera GT	$	144.79	36,159	22.12	$	6.55
Lamborghini	Lamborghini	$	87.11	37,099	14.02	$	6.21
Ferrar	Ferrari	$	96.62	32,714	15.64	$	6.18
Ford	GT	$	98.49	31,365	15.90	$	6.19
Aston Martin	Aston Martin	$	126.75	33,750	19.88	$	6.38
	Total Ultra Luxury	**$**	**139.54**	**36,487.88**	**21.93**	**$**	**6.34**
Lexus	GX 470	$	79.39	45,722	16.65	$	4.77
Land Rover	Discovery	$	70.57	51,335	17.00	$	4.15
Land Rover	LR3	$	89.87	47,290	20.19	$	4.45
Infiniti	QX4	$	69.06	43,975	14.77	$	4.68
Land Rover	Range Rover Sport	$	78.48	51,906	17.07	$	4.60
Lincoln	Aviator	$	79.95	50,584	16.24	$	4.92
Mercury	Mountaineer	$	90.17	41,419	17.75	$	5.08
Subaru	B9 Tribeca	$	59.55	46,120	13.71	$	4.35
GMC	Envoy	$	88.74	42,117	20.62	$	4.30
Buick	Rainier	$	79.34	47,910	15.80	$	5.02
Saab	9-7X	$	53.82	47,527	12.94	$	4.16
Hummer	H3	$	95.83	42,364	21.01	$	4.56
	Total Upper Mid-Range SUV	**$**	**77.90**	**46,522.42**	**16.98**	**$**	**4.59**
Acura	NSX	$	129.92	32,237	25.61	$	5.07
M-Benz	SC 430	$	114.44	32,406	21.89	$	5.23
Cadillac	XLR	$	101.30	33,958	20.77	$	4.88
Jaguar	XK	$	119.15	32,941	24.54	$	4.86
Porsche	911 Carrera 4	$	108.20	31,090	20.88	$	5.18
Porsche	911 Carrera	$	107.76	33,775	20.88	$	5.16
M-Benz	SL Coupe/Roadster	$	108.14	34,104	21.31	$	5.08
M-Benz	CL class	$	130.10	32,592	24.80	$	5.25
BMW	6 Series	$	108.33	33,922	21.93	$	4.94
Lotus	Lotus	$	78.56	32,936	15.80	$	4.97
Dodge	Viper	$	81.46	31,476	16.12	$	5.05
	Total Upper Premium Sportscars	**$**	**107.94**	**32,857.91**	**21.32**	**$**	**5.06**
	Industry Straight Average	**$**	**73.54**	**43,187**	**18.00**	**$**	**4.05**

In terms of the overall repair/maintenance story, the industry as a whole sees figures ranging from 169 percent to 121.5 percent of the original Transaction Price.

The Toyota Prius is highest followed by the Toyota Highlander. All other hybrids are above the industry average of 135.78 percent of TP except Lexus LX400h.

In the last case, it is a testament to Toyota's research and development that has put the latest hybrid technology in a more easily repairable and logical package as well as designing the equipment and components in a way that allows the repair and maintenance industries to simplify the requirements (and thus the energy needed) to repair and maintain the overall vehicle.

The following tables are a by-segment breakdown with a following sort for each model from highest to lowest in terms of share of transaction price.

Again, projections are based on demographics of current buyers and likely second-market buyers; their historic repair and maintenance practices as well as the use of dealer vs. aftermarket services (such as Quick Lubes).

These are **energy costs as a share of Transaction Price** and do not include the cost of the repair or maintenance. Such items included everything from lights for support industries to mandated pollution control and disposal requirements for toxic and non-toxic fluids as well as the energy needed to produce and distribute and stock the required parts.

The dollar figures are for the entire life of the vehicle in 2005 dollars.

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Division	Model	E Cost General Repair/ Maintenance	Lifetime R/M Share Of Trans Prc
Kia	Rio	$ 5,625.29	143.21%
Hyundai	Accent	$ 4,234.28	121.92%
Chevrolet	Aveo	$ 4,277.64	137.28%
Toyota	Echo	$ 3,824.01	133.52%
	Total Budget Cars	**$ 4,490.31**	**133.98%**
Chevrolet	Cobalt	$ 5,586.42	135.33%
Toyota	Matrix **	$ 5,414.58	131.39%
Mazda	Mazda3	$ 4,870.64	122.01%
Nissan	Sentra	$ 5,761.13	146.93%
Suzuki	Aerio	$ 5,299.30	146.43%
Mitsubishi	Lancer	$ 5,235.45	147.27%
Kia	Spectra	$ 5,203.33	147.78%
Scion	tC	$ 4,319.83	125.54%
Suzuki	Forenza	$ 4,280.36	125.12%
Ford	Focus	$ 4,457.39	136.27%
Mazda	Protégé	$ 4,586.44	145.74%
Pontiac	Sunfire	$ 4,327.97	140.20%
Chevrolet	Cavalier	$ 3,886.82	125.95%
Scion	xA	$ 4,007.89	133.73%
Toyota	Corolla	$ 3,819.13	128.03%
Dodge	Neon	$ 4,215.58	142.13%
Hyundai	Elantra	$ 4,208.02	142.79%
Saturn	Ion	$ 4,015.19	139.03%
Ford	Escort	$ 2,936.81	126.86%
Scion	xB	$ 2,758.70	141.69%
	Total Economy Cars	**$ 4,459.55**	**136.51%**
Nissan	Xterra	$ 12,168.52	147.73%
Isuzu	Trooper	$ 9,962.34	128.10%
Mazda	Mazda5	$ 9,689.69	141.60%
Isuzu	Rodeo	$ 8,694.16	138.42%
Suzuki	XL-7	$ 8,588.89	142.72%
Suzuki	Grand Vitara	$ 7,889.33	136.92%
Kia	Sorento	$ 7,915.48	147.21%
Chevrolet	Blazer	$ 6,981.74	132.28%
Suzuki	Vitara	$ 7,278.99	142.14%
Isuzu	Rodeo Sport	$ 6,183.35	123.89%
Kia	Sportage	$ 5,847.46	122.82%
Jeep	Liberty	$ 6,598.91	147.33%
Chevrolet	Tracker	$ 3,947.32	139.58%
Jeep	Wrangler	$ 3,258.36	132.40%
	Ttl Entry Level SUVs	**$ 7,500.32**	**137.37%**
Mitsubishi	Outlander	$ 12,683.82	137.36%

Hyundai	Tucson	$ 12,933.36	143.29%
Mazda	Tribute	$ 11,315.11	125.57%
Hyundai	Santa Fe	$ 10,105.22	122.83%
Pontiac	Torrent	$ 10,637.67	132.26%
Ford	Escape	$ 11,868.84	149.35%
Mercury	Mariner	$ 10,725.83	135.12%
Toyota	RAV4	$ 11,158.63	140.59%
Saturn	Vue	$ 9,628.54	127.92%
Chevrolet	Equinox	$ 9,016.52	121.50%
Honda	Element	$ 10,224.43	138.90%
Pontiac	Aztek	$ 8,461.85	134.70%
Honda	CR-V	$ 8,709.98	144.66%
	Ttl Entry Level Sportwagons	**$ 10,574.60**	**134.93%**
Nissan	Titan	$ 15,537.08	141.71%
Toyota	Tundra	$ 13,429.96	131.37%
Dodge	Ram pickup	$ 12,618.86	124.68%
Chevrolet	Silverado	$ 13,629.79	136.53%
GMC	Sierra	$ 12,253.13	122.74%
Ford	F Series	$ 14,233.06	146.04%
	Ttl Full Size Pickup	**$ 13,616.98**	**133.85%**
GMC	Savana/G Van	$ 15,953.69	145.47%
Ford	Econoline/Club Wagon	$ 14,701.57	134.31%
GMC	Express/G Van	$ 13,349.47	131.99%
Dodge	Sprinter Van	$ 14,044.04	142.42%
Dodge	Ram Van	$ 13,540.52	146.59%
Ford	Econoline van	$ 11,577.61	129.46%
	Full Size Van	**$ 13,861.15**	**138.37%**
Honda	Accord Hybrid	$ 18,587.14	138.46%
Toyota	Prius	$ 22,430.86	169.44%
Honda	Civic Hybrid	$ 18,801.11	142.52%
Ford	Escape Hybrid	$ 18,236.78	141.78%
Mercury	Mariner Hybrid	$ 17,982.43	139.95%
Honda	Insight	$ 17,688.71	147.73%
Lexus	RX 400h	$ 41,571.79	131.44%
Toyota	Highlander Hybrid	$ 30,322.07	149.78%
	Ttl Hybrids	**$ 23,202.61**	**145.14%**
Volkswagen	Phaeton	$ 61,392.85	134.38%
Audi	allroad quattro	$ 30,259.79	132.73%
Audi	A6	$ 25,064.39	123.94%
Lexus	LS 430	$ 27,372.11	141.92%
Lexus	GS 430	$ 21,956.86	122.03%
Infiniti	Q45	$ 24,113.30	139.48%
Jaguar	S-Type	$ 22,656.22	139.38%
Infiniti	M45	$ 20,199.25	127.90%
Lexus	GS 300	$ 20,731.37	131.77%
Cadillac	DTS	$ 17,286.99	122.23%

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Cadillac	DeVille	$ 19,410.86	140.74%
M-Benz	E class	$ 19,520.71	144.63%
Cadillac	Seville	$ 18,021.53	133.81%
Volvo	80 series	$ 16,793.77	124.87%
Cadillac	STS	$ 16,291.56	125.93%
BMW	5 Series	$ 15,926.01	124.49%
Acura	RL	$ 15,955.92	141.78%
Lincoln	Town Car	$ 14,142.08	125.92%
BMW	M3	$ 16,216.50	145.95%
	Total Luxury Car	**$ 22,279.58**	**132.84%**
Volkswagen	Golf	$ 15,306.58	139.29%
Volkswagen	Golf GTI	$ 14,142.97	125.76%
Saturn	L series	$ 13,697.88	132.68%
Honda	Civic	$ 13,356.72	135.45%
Chevrolet	HHR	$ 21,272.26	121.96%
Pontiac	G6	$ 14,150.36	148.28%
Chevrolet	Classic	$ 12,632.37	136.64%
Subaru	Impreza	$ 13,352.18	147.31%
Pontiac	Grand Am	$ 11,681.82	128.91%
Ford	Fusion	$ 12,612.45	140.56%
Mercury	Milan	$ 12,525.41	139.59%
Dodge	Stratus	$ 12,268.25	139.08%
Kia	Optima	$ 9,916.97	122.07%
Hyundai	Sonata	$ 11,388.99	141.18%
Suzuki	Verona	$ 10,994.91	141.45%
Volkswagen	Beetle	$ 10,045.86	134.88%
Pontiac	Vibe	$ 5,321.04	129.12%
Chevrolet	Malibu	$ 9,608.77	122.89%
Chrysler	PT Cruiser	$ 8,051.71	122.59%
Chrysler	Sebring	$ 7,155.36	136.84%
	Ttl Lower Mid-Range Cars	**$ 11,974.14**	**134.33%**
Nissan	Pathfinder	$ 11,391.63	125.93%
Toyota	4Runner	$ 13,092.71	146.50%
Mitsubishi	Montero	$ 12,041.44	135.77%
Mitsubishi	Montero Sport	$ 11,133.84	128.70%
Isuzu	Axiom	$ 10,184.31	144.07%
Land Rover	Freelander	$ 9,890.45	145.00%
Isuzu	Ascender	$ 8,291.55	132.92%
Jeep	Commander	$ 9,210.80	147.68%
Jeep	Grand Cherokee	$ 7,853.13	128.93%
Jeep	Grand Cherokee SRT-8	$ 9,884.75	142.37%
Dodge	Durango	$ 7,313.50	125.64%
Ford	Explorer	$ 7,348.34	128.49%
Chevrolet	TrailBlazer	$ 6,840.86	123.17%
	Ttl Lower Mid-Range SUV	**$ 9,575.18**	**135.01%**
Toyota	Sequoia	$ 18,639.41	124.57%
Nissan	Armada	$ 19,090.86	135.82%

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Ford	Excursion	$ 20,086.65	149.21%
Chevrolet	Suburban	$ 16,967.40	132.89%
GMC	Yukon XL	$ 17,852.76	139.89%
Ford	Expedition	$ 18,033.56	144.72%
Chevrolet	Tahoe	$ 16,109.98	134.62%
GMC	Yukon	$ 16,780.29	140.28%
	Total Large SUV	**$ 17,945.11**	**137.75%**
Chrysler	Pacifica	$ 14,508.75	128.09%
Nissan	Murano	$ 14,274.47	139.59%
Toyota	Highlander	$ 12,531.90	123.54%
Ford	Freestyle/Windstar	$ 14,941.57	147.79%
Buick	Rendezvous	$ 11,877.69	121.86%
Honda	Pilot	$ 11,217.21	125.29%
Mitsubishi	Endeavor	$ 10,615.96	131.99%
	Total Mid-Range Sportwagons	**$ 12,852.51**	**131.16%**
Volkswagen	EuroVan/T4	$ 11,783.76	126.07%
Honda	Odyssey	$ 12,076.07	130.75%
Pontiac	Montana SV6	$ 11,795.51	129.28%
Chrysler	Town & Country	$ 12,408.27	137.29%
Buick	Terraza	$ 11,516.96	127.81%
Dodge	Caravan/Grand Caravan	$ 12,852.71	144.64%
Toyota	Sienna	$ 12,794.18	144.03%
Chevrolet	Venture	$ 12,288.74	140.70%
Saturn	Relay	$ 11,801.30	135.15%
Pontiac	Montana	$ 12,346.30	141.44%
Nissan	Quest	$ 11,989.13	138.94%
Chevrolet	Uplander	$ 12,773.14	148.06%
Ford	Freestar	$ 12,239.75	145.21%
Mercury	Monterey	$ 11,943.89	141.70%
Kia	Sedona	$ 10,259.80	126.29%
Mazda	MPV	$ 11,057.25	138.98%
GMC	Safari	$ 9,489.91	135.03%
Chevrolet	Astro	$ 9,602.40	136.65%
	Total Minivans	**$ 11,723.28**	**137.11%**
Volvo	70 series	$ 13,569.95	134.17%
Volvo	60 series	$ 11,291.55	122.15%
Mercury	Zephyr	$ 12,405.02	138.65%
Acura	TL	$ 11,293.85	130.61%
Acura	CL	$ 10,138.51	123.07%
Lincoln	LS	$ 11,403.04	138.74%
Jaguar	X-Type	$ 9,771.32	125.66%
Lexus	ES 330	$ 10,630.05	140.87%
Lexus	IS 300	$ 9,760.68	130.70%
Infiniti	G35	$ 9,894.10	136.64%
M-Benz	C class	$ 9,129.99	131.86%
Cadillac	CTS	$ 8,797.03	128.48%
BMW	330	$ 9,339.61	141.81%

Buick	Park Avenue	$ 8,659.90	136.57%
BMW	325	$ 8,792.92	140.98%
Saab	9-5	$ 8,220.56	131.93%
	Total Near Luxury Cars	**$ 10,193.63**	**133.31%**
Audi	A8	$ 28,841.68	142.59%
M-Benz	S class	$ 21,650.64	144.83%
Maserati	Maserati	$ 16,822.01	135.16%
BMW	7 Series	$ 16,771.92	140.21%
Jaguar	XJ	$ 14,579.76	128.49%
	Total Premium Cars	**$ 19,733.20**	**138.26%**
Mercury	Montego	$ 11,720.59	127.08%
Buick	LaCrosse	$ 12,381.38	135.36%
Volkswagen	Passat	$ 11,243.04	134.47%
Dodge	Magnum	$ 11,703.73	142.26%
Ford	Five Hundred	$ 10,057.55	122.31%
Dodge	Charger	$ 11,133.34	138.44%
Nissan	Maxima	$ 10,563.07	131.89%
Chrysler	300/300M	$ 11,712.28	146.55%
Mitsubishi	Diamante	$ 10,441.42	132.64%
Volvo	40 series	$ 11,138.37	144.13%
Infiniti	I30/I35	$ 9,277.69	123.03%
Mazda	Millenia	$ 10,883.78	148.24%
Audi	A4/S4	$ 8,844.90	122.37%
Audi	S4		123.29%
Acura	TSX	$ 9,334.51	132.80%
Saab	9-3	$ 9,801.02	147.03%
Saab	9-2	$ 8,317.42	131.48%
Buick	Regal	$ 6,523.02	137.24%
	Total Premium Mid-Range Cars	**$ 9,726.51**	**134.48%**
M-Benz	SLK class	$ 22,765.74	140.33%
M-Benz	CLS class	$ 19,395.82	129.79%
M-Benz	CLK class	$ 17,549.00	123.35%
Porsche	Boxster	$ 17,405.19	132.51%
Chevrolet	Corvette	$ 15,751.72	122.41%
Audi	TT	$ 14,431.48	127.95%
BMW	Z8	$ 13,964.54	125.40%
BMW	Z4	$ 14,751.60	145.81%
Ford	Thunderbird	$ 8,015.25	133.21%
Chrysler	Crossfire	$ 7,895.66	146.46%
	Total Premium Sporty Cars	**15,192.60**	**132.72%**
Porsche	Cayenne	$ 13,347.99	147.28%
Volkswagen	Touareg	$ 23,635.50	140.32%
Land Rover	Range Rover	$ 22,551.48	146.60%
M-Benz	G class	$ 20,345.64	134.57%
Hummer	H1	$ 19,170.81	134.24%
Lexus	LX 470	$ 17,879.05	135.89%

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Cadillac	Escalade ESV	$ 18,838.06	144.63%
Toyota	Land Cruiser	$ 17,667.93	136.19%
Hummer	H2	$ 16,058.73	130.22%
Cadillac	Escalade	$ 16,268.81	145.05%
Lincoln	Navigator	$ 15,434.31	144.76%
	Total Premium SUV	**$ 18,290.75**	**139.98%**
Volvo	XC90	$ 16,676.48	123.11%
Lexus	RX330	$ 19,992.31	148.41%
Infiniti	FX35	$ 17,556.68	142.24%
Infiniti	FX45	$ 18,895.28	144.36%
M-Benz	R class	$ 14,894.16	123.48%
Volvo	50 series	$ 17,153.50	143.34%
Acura	MDX	$ 14,553.76	125.55%
Cadillac	SRX	$ 16,884.19	148.93%
M-Benz	M class	$ 12,794.46	126.54%
BMW	X5	$ 13,710.77	142.11%
BMW	X3	$ 11,898.77	128.97%
	Total Premium Sportwagons	**$ 15,910.03**	**136.09%**
Honda	Accord	$ 11,257.94	126.75%
Volkswagen	Jetta wagon	$ 11,035.69	132.37%
Volkswagen	Jetta	$ 10,226.43	124.50%
Toyota	Camry	$ 10,026.08	125.94%
Subaru	Baja	$ 10,087.03	129.67%
Subaru	Legacy	$ 9,951.66	132.09%
Subaru	Forester	$ 9,281.14	124.78%
Subaru	Outback	$ 8,953.83	123.74%
Mazda	Mazda6	$ 10,100.95	138.01%
Dodge	Intrepid	$ 10,123.84	140.20%
Chevrolet	Monte Carlo	$ 8,649.49	140.94%
Mitsubishi	Galant	$ 7,941.75	133.05%
Pontiac	Grand Prix	$ 8,595.71	144.03%
Buick	Century	$ 8,501.94	143.42%
Mercury	Sable	$ 8,200.96	139.07%
Ford	Taurus	$ 8,088.14	137.25%
Mazda	626	$ 7,972.52	140.09%
Nissan	Altima	$ 7,328.22	130.21%
Chevrolet	Impala	$ 7,400.01	133.84%
Hyundai	XG350	$ 7,481.05	142.85%
Kia	Amanti	$ 7,212.63	140.16%
	Total Small Rid-Range Cars	**$ 8,972.24**	**134.43%**
Chevrolet	SSR	$ 14,436.99	145.11%
Honda	Ridgeline	$ 9,470.29	128.62%
GMC	Canyon	$ 7,266.74	138.97%
GMC	Sonoma	$ 6,871.43	131.41%
Nissan	Frontier	$ 6,030.85	127.61%
Toyota	Tacoma	$ 6,532.85	139.80%
Chevrolet	Colorado	$ 5,955.15	129.94%

Mitsubishi	Raider	$ 5,857.27	127.86%
Mazda	B-Series	$ 5,780.16	130.36%
Dodge	Dakota	$ 5,811.08	140.67%
Ford	Ranger	$ 4,910.80	124.45%
Chevrolet	S10	$ 4,543.43	143.10%
	Total Small Pickup	**$ 6,955.59**	**133.99%**
Cadillac	Escalade EXT	$ 10,872.23	130.30%
Chevrolet	Avalanche	$ 11,336.99	140.64%
Lincoln	Mark LT	$ 10,438.03	131.81%
	Total Specialty Utility Pickup	**$ 10,882.42**	**134.25%**
Mazda	RX8	$ 14,639.00	144.74%
Nissan	350Z	$ 12,693.43	142.08%
Audi	A3	$ 12,320.39	144.25%
Mitsubishi	Eclipse Spyder	$ 10,297.35	121.56%
Mitsubishi	Eclipse	$ 11,472.69	139.35%
Pontiac	GTO	$ 10,573.23	130.10%
Toyota	Celica	$ 11,382.60	141.91%
Mini	Mini Cooper S	$ 9,888.03	127.21%
Acura	RSX	$ 9,725.58	125.12%
Pontiac	Solstice	$ 11,086.23	144.71%
Mini	Mini Cooper	$ 10,791.82	147.53%
Ford	Mustang	$ 9,373.50	130.86%
Toyota	MR2 Spyder	$ 9,734.15	141.98%
Mazda	MX-5 Miata	$ 7,485.21	124.92%
Honda	S2000	$ 8,678.59	146.40%
Hyundai	Tiburon	$ 7,147.54	121.93%
Pontiac	Firebird	$ 6,409.22	122.22%
Chevrolet	Camaro	$ 7,756.95	148.09%
	Total Touring	**$ 10,080.86**	**135.83%**
Toyota	Avalon	$ 11,949.45	149.07%
Buick	Lucerne	$ 10,036.51	136.70%
Pontiac	Bonneville	$ 8,838.82	121.73%
Chrysler	Concorde	$ 9,284.88	148.82%
Mercury	Grand Marquis	$ 7,272.09	125.88%
Ford	Crown Victoria	$ 8,600.62	148.98%
Buick	LeSabre	$ 6,813.75	121.87%
	Total Traditional Car	**$ 8,970.87**	**136.15%**
Maybach	Maybach	$ 62,699.29	132.86%
Rolls-Royce	Rolls-Royce	$ 56,409.03	129.87%
Bentley	Bentley	$ 54,134.17	125.87%
Porsche	Carrera GT	$ 24,235.14	131.37%
Lamborghini	Lamborghini	$ 22,464.41	137.54%
Ferrar	Ferrari	$ 23,764.11	147.21%
Ford	GT	$ 22,996.83	146.57%
Aston Martin	Aston Martin	$ 16,978.32	137.61%
	Total Ultra Luxury	**$ 35,460.16**	**136.11%**

Lexus	GX 470	$ 14,328.31	130.90%
Land Rover	Discovery	$ 14,209.79	138.12%
Land Rover	LR3	$ 12,681.79	125.03%
Infiniti	QX4	$ 13,410.08	132.55%
Land Rover	Range Rover Sport	$ 14,718.05	149.24%
Lincoln	Aviator	$ 12,223.43	127.82%
Mercury	Mountaineer	$ 12,701.39	133.46%
Subaru	B9 Tribeca	$ 13,098.68	143.50%
GMC	Envoy	$ 12,206.82	136.45%
Buick	Rainier	$ 10,884.00	122.54%
Saab	9-7X	$ 12,200.36	138.06%
Hummer	H3	$ 11,310.83	142.40%
	Total Upper Mid-Range SUV	**$ 12,831.13**	**135.01%**
Acura	NSX	$ 24,181.47	133.29%
M-Benz	SC 430	$ 18,825.41	135.62%
Cadillac	XLR	$ 16,251.07	121.74%
Jaguar	XK	$ 16,286.53	130.70%
Porsche	911 Carrera 4	$ 14,839.38	128.68%
Porsche	911 Carrera	$ 14,231.55	127.58%
M-Benz	SL Coupe/Roadster	$ 15,547.05	142.06%
M-Benz	CL class	$ 14,701.48	142.47%
BMW	6 Series	$ 11,841.83	128.20%
Lotus	Lotus	$ 12,172.52	131.78%
Dodge	Viper	$ 11,459.71	129.24%
	Total Upper Premium Sportscars	**$ 15,485.27**	**131.94%**
	Industry Straight Average	**$ 12,671.46**	**136.78%**

Once again, this is testament or a complaint about automakers. On one hand, they are able to develop vehicles that have a fairly consistent lifetime repair rate against transaction price. On the other hand, one would think repair of more expensive vehicles would be less of a share of transaction price because more “quality” has been built into the vehicle.

Unfortunately, the repair industry sees things differently. The energy cost to maintain a facility for the repair of a Maybach is not significantly higher than the energy cost to maintain a facility to repair a Rio. The dollar figure differences are a reflection of the energy needed to produce repair and maintenance parts, however.

The Dodge Viper vs. the Lotus data above shows a $700 difference in large part because the latter is more specialized, how lower volume and requires more “one off” or limited production repair/maintenance components.

In the Honda Accord Hybrid vs. the Toyota Prius, the same is true. There is a repair/maintenance difference of thousands of dollars primarily because the Honda can leverage many of the repair-maintenance items against ICE versions. The Prius, as a specialty vehicle that is effectively unique to the lineup, does and will continue to demand repair and maintenance components that are produced in lower volume with a resulting higher-per unit energy cost.

Also, since the current Prius will become “obsolete” sooner the number of cross-year components will be limited. Example: About a third of all components in a 1985 Ford F Series pickup can be used on nearly a decade’s worth of F Series trucks because of long-time consistent use of those components in manufacturing. It is highly unlikely the low-volume Prius will have such a history.

The following table shows the life-time energy costs for repair and maintenance from highest to lowest of the vehicles researched. Again, this is a share of original transaction price (not MSRP).

Dust to Dust Energy Report -- Automotive

Segment	Division	Model	E Cost for General Repair/ Maintenance	Lifetime R/M Share of Trans Prc
hy	Toyota	Prius	$ 22,430.86	169.44%
hy	Toyota	Highlander Hybrid	$ 30,322.07	149.78%
elsw	Ford	Escape	$ 11,868.84	149.35%
umr suv	Land Rover	Range Rover Sport	$ 14,718.05	149.24%
lsuv	Ford	Excursion	$ 20,086.65	149.21%
tr	Toyota	Avalon	$ 11,949.45	149.07%
tr	Ford	Crown Victoria	$ 8,600.62	148.98%
psw	Cadillac	SRX	$ 16,884.19	148.93%
tr	Chrysler	Concorde	$ 9,284.88	148.82%
psw	Lexus	RX330	$ 19,992.31	148.41%
lmr	Pontiac	G6	$ 14,150.36	148.28%
pmr	Mazda	Millenia	$ 10,883.78	148.24%
t	Chevrolet	Camaro	$ 7,756.95	148.09%
mv	Chevrolet	Uplander	$ 12,773.14	148.06%
mrsw	Ford	Freestyle/Windstar	$ 14,941.57	147.79%
e	Kia	Spectra	$ 5,203.33	147.78%
elsuv	Nissan	Xterra	$ 12,168.52	147.73%
hy	Honda	Insight	$ 17,688.71	147.73%
lmr suv	Jeep	Commander	$ 9,210.80	147.68%
t	Mini	Mini Cooper	$ 10,791.82	147.53%
elsuv	Jeep	Liberty	$ 6,598.91	147.33%
lmr	Subaru	Impreza	$ 13,352.18	147.31%
psuv	Porsche	Cayenne	$ 13,347.99	147.28%
e	Mitsubishi	Lancer	$ 5,235.45	147.27%
elsuv	Kia	Sorento	$ 7,915.48	147.21%
ul	Ferrar	Ferrari	$ 23,764.11	147.21%
pmr	Saab	9-3	$ 9,801.02	147.03%
e	Nissan	Sentra	$ 5,761.13	146.93%
psuv	Land Rover	Range Rover	$ 22,551.48	146.60%
fsv	Dodge	Ram Van	$ 13,540.52	146.59%
ul	Ford	GT	$ 22,996.83	146.57%
pmr	Chrysler	300/300M	$ 11,712.28	146.55%
lmr suv	Toyota	4Runner	$ 13,092.71	146.50%
ps	Chrysler	Crossfire	$ 7,895.66	146.46%
e	Suzuki	Aerio	$ 5,299.30	146.43%
t	Honda	S2000	$ 8,678.59	146.40%
fspu	Ford	F Series	$ 14,233.06	146.04%
l	BMW	M3	$ 16,216.50	145.95%
ps	BMW	Z4	$ 14,751.60	145.81%
e	Mazda	Protégé	$ 4,586.44	145.74%
fsv	GMC	Savana/G Van	$ 15,953.69	145.47%
mv	Ford	Freestar	$ 12,239.75	145.21%
spu	Chevrolet	SSR	$ 14,436.99	145.11%
psuv	Cadillac	Escalade	$ 16,268.81	145.05%

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lmr suv	**Land Rover**	Freelander	$ 9,890.45	145.00%
p	**M-Benz**	S class	$ 21,650.64	144.83%
psuv	**Lincoln**	Navigator	$ 15,434.31	144.76%
t	**Mazda**	RX8	$ 14,639.00	144.74%
lsuv	**Ford**	Expedition	$ 18,033.56	144.72%
t	**Pontiac**	Solstice	$ 11,086.23	144.71%
elsw	**Honda**	CR-V	$ 8,709.98	144.66%
mv	**Dodge**	Caravan/Grand Caravan	$ 12,852.71	144.64%
l	**M-Benz**	E class	$ 19,520.71	144.63%
psuv	**Cadillac**	Escalade ESV	$ 18,838.06	144.63%
psw	**Infiniti**	FX45	$ 18,895.28	144.36%
t	**Audi**	A3	$ 12,320.39	144.25%
pmr	**Volvo**	40 series	$ 11,138.37	144.13%
lmr suv	**Isuzu**	Axiom	$ 10,184.31	144.07%
mv	**Toyota**	Sienna	$ 12,794.18	144.03%
smr	**Pontiac**	Grand Prix	$ 8,595.71	144.03%
umr suv	**Subaru**	B9 Tribeca	$ 13,098.68	143.50%
smr	**Buick**	Century	$ 8,501.94	143.42%
psw	**Volvo**	50 series	$ 17,153.50	143.34%
elsw	**Hyundai**	Tucson	$ 12,933.36	143.29%
b	**Kia**	Rio	$ 5,625.29	143.21%
spu	**Chevrolet**	S10	$ 4,543.43	143.10%
smr	**Hyundai**	XG350	$ 7,481.05	142.85%
e	**Hyundai**	Elantra	$ 4,208.02	142.79%
elsuv	**Suzuki**	XL-7	$ 8,588.89	142.72%
p	**Audi**	A8	$ 28,841.68	142.59%
hy	**Honda**	Civic Hybrid	$ 18,801.11	142.52%
ups	**M-Benz**	CL class	$ 14,701.48	142.47%
fsv	**Dodge**	Sprinter Van	$ 14,044.04	142.42%
umr suv	**Hummer**	H3	$ 11,310.83	142.40%
lmr suv	**Jeep**	Grand Cherokee SRT-8	$ 9,884.75	142.37%
pmr	**Dodge**	Magnum	$ 11,703.73	142.26%
psw	**Infiniti**	FX35	$ 17,556.68	142.24%
elsuv	**Suzuki**	Vitara	$ 7,278.99	142.14%
e	**Dodge**	Neon	$ 4,215.58	142.13%
psw	**BMW**	X5	$ 13,710.77	142.11%
t	**Nissan**	350Z	$ 12,693.43	142.08%
ups	**M-Benz**	SL Coupe/Roadster	$ 15,547.05	142.06%
t	**Toyota**	MR2 Spyder	$ 9,734.15	141.98%
l	**Lexus**	LS 430	$ 27,372.11	141.92%
t	**Toyota**	Celica	$ 11,382.60	141.91%
nl	**BMW**	330	$ 9,339.61	141.81%
l	**Acura**	RL	$ 15,955.92	141.78%
hy	**Ford**	Escape Hybrid	$ 18,236.78	141.78%
fspu	**Nissan**	Titan	$ 15,537.08	141.71%
mv	**Mercury**	Monterey	$ 11,943.89	141.70%
e	**Scion**	xB	$ 2,758.70	141.69%
elsuv	**Mazda**	Mazda5	$ 9,689.69	141.60%
lmr	**Suzuki**	Verona	$ 10,994.91	141.45%
mv	**Pontiac**	Montana	$ 12,346.30	141.44%

lmr	**Hyundai**	Sonata	$ 11,388.99	141.18%
nl	**BMW**	325	$ 8,792.92	140.98%
smr	**Chevrolet**	Monte Carlo	$ 8,649.49	140.94%
nl	**Lexus**	ES 330	$ 10,630.05	140.87%
l	**Cadillac**	DeVille	$ 19,410.86	140.74%
mv	**Chevrolet**	Venture	$ 12,288.74	140.70%
spu	**Dodge**	Dakota	$ 5,811.08	140.67%
sup	**Chevrolet**	Avalanche	$ 11,336.99	140.64%
elsw	**Toyota**	RAV4	$ 11,158.63	140.59%
lmr	**Ford**	Fusion	$ 12,612.45	140.56%
ps	**M-Benz**	SLK class	$ 22,765.74	140.33%
psuv	**Volkswagen**	Touareg	$ 23,635.50	140.32%
lsuv	**GMC**	Yukon	$ 16,780.29	140.28%
p	**BMW**	7 Series	$ 16,771.92	140.21%
e	**Pontiac**	Sunfire	$ 4,327.97	140.20%
smr	**Dodge**	Intrepid	$ 10,123.84	140.20%
smr	**Kia**	Amanti	$ 7,212.63	140.16%
smr	**Mazda**	626	$ 7,972.52	140.09%
hy	**Mercury**	Mariner Hybrid	$ 17,982.43	139.95%
lsuv	**GMC**	Yukon XL	$ 17,852.76	139.89%
spu	**Toyota**	Tacoma	$ 6,532.85	139.80%
lmr	**Mercury**	Milan	$ 12,525.41	139.59%
mrsw	**Nissan**	Murano	$ 14,274.47	139.59%
elsuv	**Chevrolet**	Tracker	$ 3,947.32	139.58%
l	**Infiniti**	Q45	$ 24,113.30	139.48%
l	**Jaguar**	S-Type	$ 22,656.22	139.38%
t	**Mitsubishi**	Eclipse	$ 11,472.69	139.35%
lmr	**Volkswagen**	Golf	$ 15,306.58	139.29%
lmr	**Dodge**	Stratus	$ 12,268.25	139.08%
smr	**Mercury**	Sable	$ 8,200.96	139.07%
e	**Saturn**	Ion	$ 4,015.19	139.03%
mv	**Mazda**	MPV	$ 11,057.25	138.98%
spu	**GMC**	Canyon	$ 7,266.74	138.97%
mv	**Nissan**	Quest	$ 11,989.13	138.94%
elsw	**Honda**	Element	$ 10,224.43	138.90%
nl	**Lincoln**	LS	$ 11,403.04	138.74%
nl	**Mercury**	Zephyr	$ 12,405.02	138.65%
hy	**Honda**	Accord Hybrid	$ 18,587.14	138.46%
pmr	**Dodge**	Charger	$ 11,133.34	138.44%
elsuv	**Isuzu**	Rodeo	$ 8,694.16	138.42%
umr suv	**Land Rover**	Discovery	$ 14,209.79	138.12%
umr suv	**Saab**	9-7X	$ 12,200.36	138.06%
smr	**Mazda**	Mazda6	$ 10,100.95	138.01%
ul	**Aston Martin**	Aston Martin	$ 16,978.32	137.61%
ul	**Lamborghini**	Lamborghini	$ 22,464.41	137.54%
elsw	**Mitsubishi**	Outlander	$ 12,683.82	137.36%
mv	**Chrysler**	Town & Country	$ 12,408.27	137.29%
b	**Chevrolet**	Aveo	$ 4,277.64	137.28%
smr	**Ford**	Taurus	$ 8,088.14	137.25%
pmr	**Buick**	Regal	$ 6,523.02	137.24%

elsuv	**Suzuki**	Grand Vitara	$ 7,889.33	136.92%
lmr	**Chrysler**	Sebring	$ 7,155.36	136.84%
tr	**Buick**	Lucerne	$ 10,036.51	136.70%
mv	**Chevrolet**	Astro	$ 9,602.40	136.65%
lmr	**Chevrolet**	Classic	$ 12,632.37	136.64%
nl	**Infiniti**	G35	$ 9,894.10	136.64%
nl	**Buick**	Park Avenue	$ 8,659.90	136.57%
fspu	**Chevrolet**	Silverado	$ 13,629.79	136.53%
umr suv	**GMC**	Envoy	$ 12,206.82	136.45%
e	**Ford**	Focus	$ 4,457.39	136.27%
psuv	**Toyota**	Land Cruiser	$ 17,667.93	136.19%
psuv	**Lexus**	LX 470	$ 17,879.05	135.89%
lsuv	**Nissan**	Armada	$ 19,090.86	135.82%
		Industry Straight Average	**$ 12,671.46**	**135.78%**
lmr suv	**Mitsubishi**	Montero	$ 12,041.44	135.77%
ups	**M-Benz**	SC 430	$ 18,825.41	135.62%
lmr	**Honda**	Civic	$ 13,356.72	135.45%
pmr	**Buick**	LaCrosse	$ 12,381.38	135.36%
e	**Chevrolet**	Cobalt	$ 5,586.42	135.33%
p	**Maserati**	Maserati	$ 16,822.01	135.16%
mv	**Saturn**	Relay	$ 11,801.30	135.15%
elsw	**Mercury**	Mariner	$ 10,725.83	135.12%
mv	**GMC**	Safari	$ 9,489.91	135.03%
lmr	**Volkswagen**	Beetle	$ 10,045.86	134.88%
elsw	**Pontiac**	Aztek	$ 8,461.85	134.70%
lsuv	**Chevrolet**	Tahoe	$ 16,109.98	134.62%
psuv	**M-Benz**	G class	$ 20,345.64	134.57%
pmr	**Volkswagen**	Passat	$ 11,243.04	134.47%
l	**Volkswagen**	Phaeton	$ 61,392.85	134.38%
fsv	**Ford**	Econoline/Club Wagon	$ 14,701.57	134.31%
psuv	**Hummer**	H1	$ 19,170.81	134.24%
nl	**Volvo**	70 series	$ 13,569.95	134.17%
smr	**Chevrolet**	Impala	$ 7,400.01	133.84%
l	**Cadillac**	Seville	$ 18,021.53	133.81%
e	**Scion**	xA	$ 4,007.89	133.73%
b	**Toyota**	Echo	$ 3,824.01	133.52%
umr suv	**Mercury**	Mountaineer	$ 12,701.39	133.46%
ups	**Acura**	NSX	$ 24,181.47	133.29%
ps	**Ford**	Thunderbird	$ 8,015.25	133.21%
smr	**Mitsubishi**	Galant	$ 7,941.75	133.05%
lmr suv	**Isuzu**	Ascender	$ 8,291.55	132.92%
lsuv	**Chevrolet**	Suburban	$ 16,967.40	132.89%
u	**Maybach**	Maybach	$ 62,699.29	132.86%
pmr	**Acura**	TSX	$ 9,334.51	132.80%
l	**Audi**	allroad quattro	$ 30,259.79	132.73%
lmr	**Saturn**	L series	$ 13,697.88	132.68%
pmr	**Mitsubishi**	Diamante	$ 10,441.42	132.64%
umr suv	**Infiniti**	QX4	$ 13,410.08	132.55%
ps	**Porsche**	Boxster	$ 17,405.19	132.51%
elsuv	**Jeep**	Wrangler	$ 3,258.36	132.40%

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smr	**Volkswagen**	Jetta wagon	$ 11,035.69	132.37%
elsuv	**Chevrolet**	Blazer	$ 6,981.74	132.28%
elsw	**Pontiac**	Torrent	$ 10,637.67	132.26%
smr	**Subaru**	Legacy	$ 9,951.66	132.09%
fsv	**GMC**	Express/G Van	$ 13,349.47	131.99%
mrsw	**Mitsubishi**	Endeavor	$ 10,615.96	131.99%
nl	**Saab**	9-5	$ 8,220.56	131.93%
pmr	**Nissan**	Maxima	$ 10,563.07	131.89%
nl	**M-Benz**	C class	$ 9,129.99	131.86%
sup	**Lincoln**	Mark LT	$ 10,438.03	131.81%
ups	**Lotus**	Lotus	$ 12,172.52	131.78%
l	**Lexus**	GS 300	$ 20,731.37	131.77%
pmr	**Saab**	9-2	$ 8,317.42	131.48%
hy	**Lexus**	RX 400h	$ 41,571.79	131.44%
spu	**GMC**	Sonoma	$ 6,871.43	131.41%
e	**Toyota**	Matrix **	$ 5,414.58	131.39%
fspu	**Toyota**	Tundra	$ 13,429.96	131.37%
ul	**Porsche**	Carrera GT	$ 24,235.14	131.37%
umr suv	**Lexus**	GX 470	$ 14,328.31	130.90%
t	**Ford**	Mustang	$ 9,373.50	130.86%
mv	**Honda**	Odyssey	$ 12,076.07	130.75%
nl	**Lexus**	IS 300	$ 9,760.68	130.70%
ups	**Jaguar**	XK	$ 16,286.53	130.70%
nl	**Acura**	TL	$ 11,293.85	130.61%
spu	**Mazda**	B-Series	$ 5,780.16	130.36%
sup	**Cadillac**	Escalade EXT	$ 10,872.23	130.30%
psuv	**Hummer**	H2	$ 16,058.73	130.22%
smr	**Nissan**	Altima	$ 7,328.22	130.21%
t	**Pontiac**	GTO	$ 10,573.23	130.10%
spu	**Chevrolet**	Colorado	$ 5,955.15	129.94%
u	**Rolls-Royce**	Rolls-Royce	$ 56,409.03	129.87%
ps	**M-Benz**	CLS class	$ 19,395.82	129.79%
smr	**Subaru**	Baja	$ 10,087.03	129.67%
fsv	**Ford**	Econoline van	$ 11,577.61	129.46%
mv	**Pontiac**	Montana SV6	$ 11,795.51	129.28%
ups	**Dodge**	Viper	$ 11,459.71	129.24%
lmr	**Pontiac**	Vibe	$ 5,321.04	129.12%
psw	**BMW**	X3	$ 11,898.77	128.97%
lmr suv	**Jeep**	Grand Cherokee	$ 7,853.13	128.93%
lmr	**Pontiac**	Grand Am	$ 11,681.82	128.91%
lmr suv	**Mitsubishi**	Montero Sport	$ 11,133.84	128.70%
ups	**Porsche**	911 Carrera 4	$ 14,839.38	128.68%
spu	**Honda**	Ridgeline	$ 9,470.29	128.62%
lmr suv	**Ford**	Explorer	$ 7,348.34	128.49%
p	**Jaguar**	XJ	$ 14,579.76	128.49%
nl	**Cadillac**	CTS	$ 8,797.03	128.48%
ups	**BMW**	6 Series	$ 11,841.83	128.20%
elsuv	**Isuzu**	Trooper	$ 9,962.34	128.10%
mrsw	**Chrysler**	Pacifica	$ 14,508.75	128.09%
e	**Toyota**	Corolla	$ 3,819.13	128.03%

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ps	**Audi**	TT	$ 14,431.48	127.95%
elsw	**Saturn**	Vue	$ 9,628.54	127.92%
l	**Infiniti**	M45	$ 20,199.25	127.90%
spu	**Mitsubishi**	Raider	$ 5,857.27	127.86%
umr suv	**Lincoln**	Aviator	$ 12,223.43	127.82%
mv	**Buick**	Terraza	$ 11,516.96	127.81%
spu	**Nissan**	Frontier	$ 6,030.85	127.61%
ups	**Porsche**	911 Carrera	$ 14,231.55	127.58%
t	**Mini**	Mini Cooper S	$ 9,888.03	127.21%
pmr	**Mercury**	Montego	$ 11,720.59	127.08%
e	**Ford**	Escort	$ 2,936.81	126.86%
smr	**Honda**	Accord	$ 11,257.94	126.75%
psw	**M-Benz**	M class	$ 12,794.46	126.54%
mv	**Kia**	Sedona	$ 10,259.80	126.29%
mv	**Volkswagen**	EuroVan/T4	$ 11,783.76	126.07%
e	**Chevrolet**	Cavalier	$ 3,886.82	125.95%
smr	**Toyota**	Camry	$ 10,026.08	125.94%
l	**Cadillac**	STS	$ 16,291.56	125.93%
lmr suv	**Nissan**	Pathfinder	$ 11,391.63	125.93%
l	**Lincoln**	Town Car	$ 14,142.08	125.92%
tr	**Mercury**	Grand Marquis	$ 7,272.09	125.88%
ul	**Bentley**	Bentley	$ 54,134.17	125.87%
lmr	**Volkswagen**	Golf GTI	$ 14,142.97	125.76%
nl	**Jaguar**	X-Type	$ 9,771.32	125.66%
lmr suv	**Dodge**	Durango	$ 7,313.50	125.64%
elsw	**Mazda**	Tribute	$ 11,315.11	125.57%
psw	**Acura**	MDX	$ 14,553.76	125.55%
e	**Scion**	tC	$ 4,319.83	125.54%
ps	**BMW**	Z8	$ 13,964.54	125.40%
mrsw	**Honda**	Pilot	$ 11,217.21	125.29%
e	**Suzuki**	Forenza	$ 4,280.36	125.12%
t	**Acura**	RSX	$ 9,725.58	125.12%
umr suv	**Land Rover**	LR3	$ 12,681.79	125.03%
t	**Mazda**	MX-5 Miata	$ 7,485.21	124.92%
l	**Volvo**	80 series	$ 16,793.77	124.87%
smr	**Subaru**	Forester	$ 9,281.14	124.78%
fspu	**Dodge**	Ram pickup	$ 12,618.86	124.68%
lsuv	**Toyota**	Sequoia	$ 18,639.41	124.57%
smr	**Volkswagen**	Jetta	$ 10,226.43	124.50%
l	**BMW**	5 Series	$ 15,926.01	124.49%
spu	**Ford**	Ranger	$ 4,910.80	124.45%
l	**Audi**	A6	$ 25,064.39	123.94%
elsuv	**Isuzu**	Rodeo Sport	$ 6,183.35	123.89%
smr	**Subaru**	Outback	$ 8,953.83	123.74%
mrsw	**Toyota**	Highlander	$ 12,531.90	123.54%
psw	**M-Benz**	R class	$ 14,894.16	123.48%
ps	**M-Benz**	CLK class	$ 17,549.00	123.35%
pmr	**Audi**	S4		123.29%
lmr suv	**Chevrolet**	TrailBlazer	$ 6,840.86	123.17%
psw	**Volvo**	XC90	$ 16,676.48	123.11%

nl	**Acura**	CL	$ 10,138.51	123.07%
pmr	**Infiniti**	I30/I35	$ 9,277.69	123.03%
lmr	**Chevrolet**	Malibu	$ 9,608.77	122.89%
elsw	**Hyundai**	Santa Fe	$ 10,105.22	122.83%
elsuv	**Kia**	Sportage	$ 5,847.46	122.82%
fspu	**GMC**	Sierra	$ 12,253.13	122.74%
lmr	**Chrysler**	PT Cruiser	$ 8,051.71	122.59%
umr suv	**Buick**	Rainier	$ 10,884.00	122.54%
ps	**Chevrolet**	Corvette	$ 15,751.72	122.41%
pmr	**Audi**	A4/S4	$ 8,844.90	122.37%
pmr	**Ford**	Five Hundred	$ 10,057.55	122.31%
l	**Cadillac**	DTS	$ 17,286.99	122.23%
t	**Pontiac**	Firebird	$ 6,409.22	122.22%
nl	**Volvo**	60 series	$ 11,291.55	122.15%
lmr	**Kia**	Optima	$ 9,916.97	122.07%
l	**Lexus**	GS 430	$ 21,956.86	122.03%
e	**Mazda**	Mazda3	$ 4,870.64	122.01%
lmr	**Chevrolet**	HHR	$ 21,272.26	121.96%
t	**Hyundai**	Tiburon	$ 7,147.54	121.93%
b	**Hyundai**	Accent	$ 4,234.28	121.92%
tr	**Buick**	LeSabre	$ 6,813.75	121.87%
mrsw	**Buick**	Rendezvous	$ 11,877.69	121.86%
ups	**Cadillac**	XLR	$ 16,251.07	121.74%
tr	**Pontiac**	Bonneville	$ 8,838.82	121.73%
t	**Mitsubishi**	Eclipse Spyder	$ 10,297.35	121.56%
elsw	**Chevrolet**	Equinox	$ 9,016.52	121.50%

It should be pointed out that government expenditures are similarly put into play here. That is, the use of taxes for road construction, highway maintenance, pollution enforcement, etc.. Auto-related law enforcement is part of the Fuel Economy data since that portion relates to the consumer's use of vehicles.

CHAPTER FIVE – Accident Repair

Another key ingredient in the total Dust to Dust Energy use can be found in accident repair and the support industries. It is here that high-end, high-tech sports cars, premium passenger cars and hybrids have a high cost vs. the industry as a whole.

As the following data shows, for many vehicles the share of total lifetime energy usage for accident repairs is fairly stable across many market segments and vehicle prices. Generally the share is about 1.8 to 2.2 percent with an industry average of approximately 2.1 percent.

The primary reason for this relatively consistent energy cost for accident repair is the technology that has been brought to the body shop industry ranging from laser alignments to low-energy production of replacement parts. In effect, the accident repair industry has introduced technology that lowers the once-dominant cost of labor to an extremely manageable level.

Additionally, there has been significant consolidation in the repair industry as large, well equipped and modern facilities transitioned from body-on-frame vehicles to unibody and expertise in making such repairs has reached extraordinarily high levels.

So when looking at the data, we see that most segment averages are close in terms of energy cost over the lifetime of the vehicle **(See Yellow highlighted column.) as a share of that model's Dust to Dust energy cost.**

The **Lifetime Expense** for accident repair is shown in the first column. This has been adjusted for inflation and uses 2005 dollars.

In some instances you will note that the percentages for vehicles that are considered to be "identical" are moderately to even significantly different. The calculations have included general use, demographics of both the first and likely subsequent owners and the repair industry's access to specific brand repair parts. For example, while the Chevrolet Silverado and GMC Sierra are virtually the same vehicles, the latter is typically upgraded and has slightly higher content than the Chevrolet version. In addition, some minor parts that are exclusive to GMC cost slightly more than the Chevrolet component. In addition, their use environments are different.

In those cases where the prices are dramatically different, much can be attributed to the types of drivers and frequency of accidents within those demographics. The Dollar figures are for Energy needed for repair, not the entire cost of the repairs.

Dust to Dust Energy Report -- Automotive

Division	Model	Lifetime Accident Repair	Lifetime Accident Repair	Accident Repair as % Tran Prc
Kia	Rio	$ 2,654.96	1.70%	20.51%
Hyundai	Accent	$ 2,587.02	2.01%	20.42%
Chevrolet	Aveo	$ 1,987.28	1.83%	15.74%
Toyota	Echo	$ 1,865.01	1.69%	16.63%
	Total Budget Cars	**$ 2,273.57**	**1.81%**	**18.39%**
Chevrolet	Cobalt	$ 3,236.02	1.89%	19.27%
Toyota	Matrix **	$ 3,113.11	1.90%	17.87%
Mazda	Mazda3	$ 3,197.50	1.99%	19.53%
Nissan	Sentra	$ 2,714.51	1.72%	17.00%
Suzuki	Aerio	$ 2,584.40	1.83%	17.10%
Mitsubishi	Lancer	$ 2,499.17	1.86%	14.93%
Kia	Spectra	$ 2,252.84	1.65%	14.40%
Scion	tC	$ 2,066.02	1.76%	12.19%
Suzuki	Forenza	$ 2,089.11	1.74%	12.96%
Ford	Focus	$ 2,387.83	1.76%	14.58%
Mazda	Protégé	$ 2,487.00	2.00%	17.00%
Pontiac	Sunfire	$ 2,152.97	1.81%	13.52%
Chevrolet	Cavalier	$ 2,175.82	1.89%	13.88%
Scion	xA	$ 2,180.16	1.90%	16.58%
Toyota	Corolla	$ 2,189.96	1.77%	13.80%
Dodge	Neon	$ 1,960.77	1.82%	12.71%
Hyundai	Elantra	$ 2,355.12	2.01%	15.36%
Saturn	Ion	$ 1,905.73	1.67%	12.70%
Ford	Escort	$ 1,996.30	1.83%	13.75%
Scion	xB	$ 1,589.51	1.76%	10.62%
	Total Economy Cars	**$ 2,356.69**	**1.83%**	**15.01%**
Nissan	Xterra	$ 7,336.33	1.90%	29.91%
Isuzu	Trooper	$ 6,781.56	1.70%	25.57%
Mazda	Mazda5	$ 5,284.25	1.84%	28.19%

Dust to Dust Energy Report -- Automotive

Isuzu	Rodeo	$ 5,105.54	1.80%	26.22%
Suzuki	XL-7	$ 4,825.30	1.98%	19.09%
Suzuki	Grand Vitara	$ 4,497.85	1.86%	19.02%
Kia	Sorento	$ 3,302.45	1.75%	13.52%
Chevrolet	Blazer	$ 4,954.38	1.83%	24.44%
Suzuki	Vitara	$ 3,594.29	1.81%	18.98%
Isuzu	Rodeo Sport	$ 3,512.36	1.77%	17.96%
Kia	Sportage	$ 3,362.76	1.81%	15.93%
Jeep	Liberty	$ 4,092.91	1.97%	15.69%
Chevrolet	Tracker	$ 1,794.65	1.69%	9.67%
Jeep	Wrangler	$ 2,175.47	1.74%	8.57%
	Ttl Entry Level SUVs	**$ 4,330.01**	**1.82%**	**19.40%**
Mitsubishi	Outlander	$ 8,253.09	1.99%	36.42%
Hyundai	Tucson	$ 5,756.93	1.78%	25.67%
Mazda	Tribute	$ 6,428.96	1.90%	27.76%
Hyundai	Santa Fe	$ 5,975.81	1.96%	24.02%
Pontiac	Torrent	$ 6,395.66	2.00%	27.77%
Ford	Escape	$ 5,966.30	1.90%	25.25%
Mercury	Mariner	$ 5,471.72	1.86%	22.85%
Toyota	RAV4	$ 5,964.25	1.89%	25.22%
Saturn	Vue	$ 5,413.05	1.82%	24.37%
Chevrolet	Equinox	$ 6,781.30	1.97%	27.94%
Honda	Element	$ 4,309.80	1.68%	21.83%
Pontiac	Aztek	$ 4,869.54	1.88%	21.93%
Honda	CR-V	$ 4,541.32	1.97%	18.53%
	Ttl Entry Level Sportwagons	**$ 5,855.98**	**1.89%**	**25.35%**
Nissan	Titan	$ 7,776.33	1.71%	24.74%
Toyota	Tundra	$ 8,482.18	1.77%	27.66%
Dodge	Ram pickup	$ 10,959.52	1.91%	28.38%
Chevrolet	Silverado	$ 10,306.10	1.76%	31.48%
GMC	Sierra	$ 10,288.46	1.81%	29.21%
Ford	F Series	$ 11,987.41	1.87%	31.86%
	Ttl Full Size Pickup	**$ 9,966.67**	**1.81%**	**28.99%**

Dust to Dust Energy Report -- Automotive

GMC	Savana/G Van	$ 12,592.38	1.72%	47.75%
Ford	Econoline/Club Wagon	$ 13,099.65	1.89%	43.60%
GMC	Express/G Van	$ 11,492.57	1.83%	41.61%
Dodge	Sprinter Van	$ 16,966.27	1.84%	48.98%
Dodge	Ram Van	$ 9,263.01	1.80%	36.15%
Ford	Econoline van	$ 11,903.36	1.93%	41.58%
	Full Size Van	**$ 12,552.87**	**1.84%**	**43.56%**
Honda	Accord Hybrid	$ 10,446.23	2.71%	34.57%
Toyota	Prius	$ 15,192.48	4.29%	65.65%
Honda	Civic Hybrid	$ 9,439.12	2.58%	39.95%
Ford	Escape Hybrid	$ 12,235.25	2.73%	46.22%
Mercury	Mariner Hybrid	$ 12,261.44	2.81%	43.44%
Honda	Insight	$ 12,076.18	3.77%	59.68%
Lexus	RX 400h	$ 36,200.15	4.77%	78.33%
Toyota	Highlander Hybrid	$ 15,056.71	3.92%	41.34%
	Ttl Hybrids	**$ 15,363.45**	**3.45%**	**52.40%**
Volkswagen	Phaeton	$ 73,770.96	2.73%	74.20%
Audi	allroad quattro	$ 32,550.92	2.88%	71.47%
Audi	A6	$ 20,262.07	2.16%	39.43%
Lexus	LS 430	$ 20,794.97	1.97%	37.32%
Lexus	GS 430	$ 15,426.31	1.93%	30.64%
Infiniti	Q45	$ 19,359.28	2.27%	34.07%
Jaguar	S-Type	$ 20,142.57	3.06%	44.14%
Infiniti	M45	$ 9,718.76	1.99%	21.29%
Lexus	GS 300	$ 8,953.21	1.77%	20.16%
Cadillac	DTS	$ 10,947.77	1.66%	23.52%
Cadillac	DeVille	$ 12,505.97	1.82%	30.23%
M-Benz	E class	$ 20,945.79	2.47%	33.86%
Cadillac	Seville	$ 10,227.61	1.91%	24.81%
Volvo	80 series	$ 12,734.95	1.91%	33.34%
Cadillac	STS	$ 11,864.68	1.73%	25.34%
BMW	5 Series	$ 12,608.61	1.94%	31.36%
Acura	RL	$ 7,745.86	1.71%	15.08%
Lincoln	Town Car	$ 11,107.16	1.84%	24.53%

BMW	M3	$ 7,721.06	1.98%	16.46%
	Total Luxury Car	**$ 17,862.55**	**2.09%**	**35.55%**
Volkswagen	Golf	$ 6,882.47	1.69%	31.79%
Volkswagen	Golf GTI	$ 7,796.93	1.96%	31.42%
Saturn	L series	$ 7,895.29	1.90%	40.55%
Honda	Civic	$ 7,366.47	1.71%	33.01%
Chevrolet	HHR	$ 7,939.82	1.96%	44.32%
Pontiac	G6	$ 6,554.16	1.76%	32.28%
Chevrolet	Classic	$ 9,820.35	1.89%	50.02%
Subaru	Impreza	$ 5,120.03	1.68%	21.68%
Pontiac	Grand Am	$ 7,857.16	1.84%	35.80%
Ford	Fusion	$ 7,484.02	1.77%	36.99%
Mercury	Milan	$ 7,783.30	1.87%	36.11%
Dodge	Stratus	$ 8,572.41	1.97%	44.13%
Kia	Optima	$ 5,778.18	1.80%	32.91%
Hyundai	Sonata	$ 5,516.68	1.72%	27.94%
Suzuki	Verona	$ 5,190.48	1.79%	27.69%
Volkswagen	Beetle	$ 5,501.37	1.76%	27.65%
Pontiac	Vibe	$ 3,207.87	1.97%	17.38%
Chevrolet	Malibu	$ 5,692.89	1.82%	25.37%
Chrysler	PT Cruiser	$ 5,292.41	1.71%	22.88%
Chrysler	Sebring	$ 3,872.60	1.84%	20.94%
	Ttl Lower Mid-Range Cars	**$ 6,556.25**	**1.82%**	**31.88%**
Nissan	Pathfinder	$ 6,489.45	1.85%	19.72%
Toyota	4Runner	$ 7,103.05	1.84%	19.26%
Mitsubishi	Montero	$ 6,561.42	1.92%	19.17%
Mitsubishi	Montero Sport	$ 5,788.67	1.92%	19.68%
Isuzu	Axiom	$ 4,237.38	1.72%	14.73%
Land Rover	Freelander	$ 4,893.27	1.85%	19.29%
Isuzu	Ascender	$ 4,387.47	1.78%	16.54%
Jeep	Commander	$ 5,667.37	1.78%	15.41%
Jeep	Grand Cherokee	$ 5,280.13	1.69%	13.19%
Jeep	Grand Cherokee SRT-8	$ 5,932.88	1.92%	14.15%
Dodge	Durango	$ 4,941.92	1.88%	15.63%

Ford	Explorer	$ 4,843.82	1.70%	15.42%
Chevrolet	TrailBlazer	$ 5,047.02	1.98%	18.54%
	Ttl Lower Mid-Range SUV	**$ 5,474.91**	**1.83%**	**16.82%**
Toyota	Sequoia	$ 11,246.50	1.75%	26.83%
Nissan	Armada	$ 9,947.62	1.78%	25.03%
Ford	Excursion	$ 15,731.05	1.77%	32.55%
Chevrolet	Suburban	$ 17,132.09	2.01%	41.70%
GMC	Yukon XL	$ 15,108.82	1.78%	30.30%
Ford	Expedition	$ 15,460.16	1.78%	34.71%
Chevrolet	Tahoe	$ 14,246.93	1.81%	36.80%
GMC	Yukon	$ 14,003.76	1.80%	33.27%
	Total Large SUV	**$ 14,109.62**	**1.81%**	**32.60%**
Chrysler	Pacifica	$ 8,597.56	1.69%	28.45%
Nissan	Murano	$ 7,594.47	1.70%	25.12%
Toyota	Highlander	$ 6,835.48	1.76%	23.19%
Ford	Freestyle/Windstar	$ 8,842.74	1.73%	32.62%
Buick	Rendezvous	$ 7,153.57	1.78%	25.88%
Honda	Pilot	$ 5,758.71	1.68%	18.03%
Mitsubishi	Endeavor	$ 6,010.15	1.99%	18.93%
	Total Mid-Range Sportwagons	**$ 7,256.10**	**1.76%**	**24.38%**
Volkswagen	EuroVan/T4	$ 7,294.94	2.00%	19.86%
Honda	Odyssey	$ 7,746.90	1.78%	22.35%
Pontiac	Montana SV6	$ 7,397.23	1.99%	28.77%
Chrysler	Town & Country	$ 6,637.88	1.75%	19.28%
Buick	Terraza	$ 7,283.94	1.84%	22.45%
Dodge	Caravan/Grand Caravan	$ 6,223.32	1.74%	23.77%
Toyota	Sienna	$ 5,786.94	1.68%	16.65%
Chevrolet	Venture	$ 6,860.47	1.85%	28.21%
Saturn	Relay	$ 6,388.06	1.84%	23.36%
Pontiac	Montana	$ 5,938.98	1.67%	23.37%
Nissan	Quest	$ 6,268.66	1.85%	19.92%
Chevrolet	Uplander	$ 5,945.38	1.80%	18.34%

Dust to Dust Energy Report -- Automotive

Ford	Freestar	$ 6,194.95	1.86%	27.86%
Mercury	Monterey	$ 6,019.31	1.83%	22.07%
Kia	Sedona	$ 4,622.54	1.68%	18.59%
Mazda	MPV	$ 5,635.26	1.85%	20.77%
GMC	Safari	$ 6,620.02	1.90%	28.61%
Chevrolet	Astro	$ 6,964.86	1.97%	28.11%
	Total Minivans	**$ 6,434.98**	**1.83%**	**22.48%**
Volvo	70 series	$ 7,577.07	1.65%	19.98%
Volvo	60 series	$ 6,282.56	1.72%	17.67%
Mercury	Zephyr	$ 7,232.21	1.84%	25.15%
Acura	TL	$ 6,749.90	1.86%	19.76%
Acura	CL	$ 7,359.46	2.00%	22.56%
Lincoln	LS	$ 5,380.99	1.71%	15.07%
Jaguar	X-Type	$ 5,902.24	1.83%	17.82%
Lexus	ES 330	$ 5,670.06	1.78%	17.98%
Lexus	IS 300	$ 5,611.82	1.89%	16.16%
Infiniti	G35	$ 5,624.29	1.84%	17.17%
M-Benz	C class	$ 5,521.15	1.90%	14.32%
Cadillac	CTS	$ 5,000.99	1.86%	15.75%
BMW	330	$ 5,206.05	1.83%	14.76%
Buick	Park Avenue	$ 4,847.11	1.74%	12.63%
BMW	325	$ 5,078.04	1.94%	13.77%
Saab	9-5	$ 4,310.67	1.74%	12.16%
	Total Near Luxury Cars	**$ 5,834.66**	**1.82%**	**16.88%**
Audi	A8	$ 43,131.43	4.06%	48.07%
M-Benz	S class	$ 32,139.11	3.49%	25.85%
Maserati	Maserati	$ 29,146.25	5.89%	25.36%
BMW	7 Series	$ 19,237.12	3.26%	17.92%
Jaguar	XJ	$ 9,068.07	2.01%	11.69%
	Total Premium Cars	**$ 26,544.40**	**3.74%**	**25.82%**
Mercury	Montego	$ 6,227.55	1.81%	22.62%
Buick	LaCrosse	$ 7,371.20	1.99%	26.40%
Volkswagen	Passat	$ 7,091.77	1.80%	23.59%

Dust to Dust Energy Report -- Automotive

Dodge	Magnum	$ 7,279.16	1.97%	25.69%
Ford	Five Hundred	$ 6,525.88	1.88%	28.14%
Dodge	Charger	$ 5,601.43	1.65%	22.68%
Nissan	Maxima	$ 6,259.54	1.65%	22.27%
Chrysler	300/300M	$ 7,268.36	1.93%	23.64%
Mitsubishi	Diamante	$ 5,455.40	1.87%	20.58%
Volvo	40 series	$ 5,346.31	1.74%	21.04%
Infiniti	I30/I35	$ 6,610.94	1.90%	22.15%
Mazda	Millenia	$ 4,092.53	1.67%	14.81%
Audi	A4/S4	$ 5,426.33	1.81%	14.87%
Audi	S4	$ 7,029.06	2.17%	12.47%
Acura	TSX	$ 5,685.09	1.95%	19.78%
Saab	9-3	$ 5,627.57	1.89%	18.67%
Saab	9-2	$ 5,150.50	1.94%	19.99%
Buick	Regal	$ 3,262.51	1.84%	13.87%
	Total Premium Mid-Range Cars	**$ 5,961.73**	**1.86%**	**20.21%**
M-Benz	SLK class	$ 13,990.82	2.21%	31.17%
M-Benz	CLS class	$ 21,470.14	2.47%	34.23%
M-Benz	CLK class	$ 17,539.82	2.63%	32.82%
Porsche	Boxster	$ 10,679.10	2.11%	20.30%
Chevrolet	Corvette	$ 14,274.24	2.79%	23.70%
Audi	TT	$ 7,142.72	1.83%	17.24%
BMW	Z8	$ 10,110.47	2.09%	20.11%
BMW	Z4	$ 7,774.48	2.13%	20.13%
Ford	Thunderbird	$ 5,075.69	2.01%	13.99%
Chrysler	Crossfire	$ 3,362.52	1.94%	10.77%
	Total Premium Sporty Cars	**$ 11,142.00**	**2.22%**	**23.62%**
Porsche	Cayenne	$ 14,403.20	1.80%	14.21%
Volkswagen	Touareg	$ 13,609.87	1.77%	33.46%
Land Rover	Range Rover	$ 18,510.06	2.38%	20.91%
M-Benz	G class	$ 23,128.62	2.63%	25.05%
Hummer	H1	$ 24,973.44	1.88%	18.29%
Lexus	LX 470	$ 14,512.48	2.11%	21.92%

Dust to Dust Energy Report -- Automotive

Cadillac	Escalade ESV	$ 14,736.10	1.97%	20.94%
Toyota	Land Cruiser	$ 14,071.30	2.36%	25.88%
Hummer	H2	$ 10,314.98	1.73%	18.83%
Cadillac	Escalade	$ 10,986.90	1.67%	18.71%
Lincoln	Navigator	$ 10,256.33	1.95%	19.72%
	Total Premium SUV	**$ 15,409.39**	**2.02%**	**20.78%**
Volvo	XC90	$ 14,541.28	1.91%	31.42%
Lexus	RX330	$ 11,616.49	1.83%	31.21%
Infiniti	FX35	$ 9,747.71	1.86%	24.86%
Infiniti	FX45	$ 11,168.86	1.93%	22.66%
M-Benz	R class	$ 8,156.34	1.68%	15.88%
Volvo	50 series	$ 8,567.89	1.87%	30.00%
Acura	MDX	$ 10,984.51	1.98%	25.83%
Cadillac	SRX	$ 9,087.62	1.91%	20.69%
M-Benz	M class	$ 10,190.34	1.91%	22.28%
BMW	X5	$ 7,114.54	1.81%	10.48%
BMW	X3	$ 7,071.22	1.87%	21.28%
	Total Premium Sportwagons	**$ 9,840.62**	**1.87%**	**22.31%**
Honda	Accord	$ 8,246.28	1.81%	28.27%
Volkswagen	Jetta wagon	$ 5,120.23	1.84%	23.57%
Volkswagen	Jetta	$ 4,470.55	1.68%	18.99%
Toyota	Camry	$ 7,040.88	1.82%	26.64%
Subaru	Baja	$ 5,515.23	1.84%	23.16%
Subaru	Legacy	$ 5,769.03	2.00%	19.61%
Subaru	Forester	$ 5,632.54	1.87%	21.39%
Subaru	Outback	$ 5,413.84	1.92%	17.39%
Mazda	Mazda6	$ 5,092.46	1.75%	19.91%
Dodge	Intrepid	$ 6,340.68	2.01%	32.31%
Chevrolet	Monte Carlo	$ 5,266.38	1.85%	19.61%
Mitsubishi	Galant	$ 4,213.80	1.88%	17.21%
Pontiac	Grand Prix	$ 4,173.98	1.77%	15.73%
Buick	Century	$ 4,303.57	1.70%	21.86%
Mercury	Sable	$ 5,614.45	1.93%	28.26%
Ford	Taurus	$ 5,780.00	1.94%	29.29%

Mazda	626	$ 4,705.15	1.97%	23.48%
Nissan	Altima	$ 3,846.27	1.82%	15.21%
Chevrolet	Impala	$ 3,966.69	1.68%	15.61%
Hyundai	XG350	$ 3,629.31	1.87%	15.70%
Kia	Amanti	$ 3,437.29	1.68%	15.03%
	Total Small Rid-Range Cars	**$ 5,122.79**	**1.84%**	**21.07%**
Chevrolet	SSR	$ 5,761.32	1.65%	17.83%
Honda	Ridgeline	$ 4,860.14	1.65%	16.12%
GMC	Canyon	$ 4,222.18	1.75%	19.75%
GMC	Sonoma	$ 4,079.73	1.70%	18.49%
Nissan	Frontier	$ 3,609.81	1.82%	15.20%
Toyota	Tacoma	$ 3,908.69	1.97%	23.14%
Chevrolet	Colorado	$ 3,911.58	1.89%	17.53%
Mitsubishi	Raider	$ 3,836.68	1.95%	12.94%
Mazda	B-Series	$ 3,486.45	1.66%	16.03%
Dodge	Dakota	$ 3,348.17	1.92%	13.52%
Ford	Ranger	$ 3,623.19	1.99%	18.73%
Chevrolet	S10	$ 2,372.29	1.77%	12.97%
	Total Small Pickup	**$ 3,918.35**	**1.81%**	**16.64%**
Cadillac	Escalade EXT	$ 10,454.45	2.31%	18.37%
Chevrolet	Avalanche	$ 11,851.34	2.56%	36.41%
Lincoln	Mark LT	$ 7,127.34	1.91%	17.63%
	Total Specialty Utility Pickup	**$ 9,811.04**	**2.26%**	**22.66%**
Mazda	RX8	$ 5,762.05	1.67%	21.07%
Nissan	350Z	$ 5,712.28	1.67%	15.77%
Audi	A3	$ 4,836.76	1.66%	15.96%
Mitsubishi	Eclipse Spyder	$ 4,304.81	1.74%	13.82%
Mitsubishi	Eclipse	$ 4,888.24	1.68%	23.10%
Pontiac	GTO	$ 5,241.77	1.80%	19.04%
Toyota	Celica	$ 5,007.45	1.83%	23.15%
Mini	Mini Cooper S	$ 5,436.39	1.77%	25.47%
Acura	RSX	$ 5,156.53	1.70%	22.86%
Pontiac	Solstice	$ 5,782.23	2.01%	27.06%

Dust to Dust Energy Report -- Automotive

Mini	Mini Cooper	$ 5,400.62	1.78%	24.90%
Ford	Mustang	$ 5,663.91	1.78%	20.41%
Toyota	MR2 Spyder	$ 4,797.57	1.76%	20.80%
Mazda	MX-5 Miata	$ 4,576.80	1.71%	18.72%
Honda	S2000	$ 4,501.73	1.91%	14.60%
Hyundai	Tiburon	$ 4,944.50	1.79%	28.03%
Pontiac	Firebird	$ 4,319.50	1.94%	17.40%
Chevrolet	Camaro	$ 4,326.12	1.88%	16.87%
	Total Touring	**$ 5,036.63**	**1.78%**	**19.86%**
Toyota	Avalon	$ 6,524.70	1.65%	21.50%
Buick	Lucerne	$ 5,836.62	1.83%	17.69%
Pontiac	Bonneville	$ 5,902.67	1.81%	20.63%
Chrysler	Concorde	$ 5,155.92	1.84%	19.40%
Mercury	Grand Marquis	$ 4,960.00	1.69%	19.27%
Ford	Crown Victoria	$ 4,986.18	1.66%	21.44%
Buick	LeSabre	$ 4,645.53	1.85%	18.65%
	Total Traditional Car	**$ 5,430.23**	**1.76%**	**19.75%**
Maybach	Maybach	$ 65,783.41	2.21%	17.34%
Rolls-Royce	Rolls-Royce	$ 49,764.68	1.71%	15.12%
Bentley	Bentley	$ 55,779.65	1.95%	32.33%
Porsche	Carrera GT	$ 29,138.08	3.46%	6.31%
Lamborghini	Lamborghini	$ 28,229.09	5.82%	14.04%
Ferrar	Ferrari	$ 34,983.05	7.42%	13.71%
Ford	GT	$ 38,638.45	8.65%	28.25%
Aston Martin	Aston Martin	$ 17,100.17	3.62%	7.09%
	Total Ultra Luxury	**$ 39,927.07**	**4.36%**	**14.67%**
Lexus	GX 470	$ 8,891.87	1.87%	20.11%
Land Rover	Discovery	$ 9,226.18	1.80%	20.80%
Land Rover	LR3	$ 10,776.47	1.95%	22.75%
Infiniti	QX4	$ 6,561.29	1.75%	15.36%
Land Rover	Range Rover Sport	$ 9,722.76	1.95%	14.86%
Lincoln	Aviator	$ 8,248.37	1.84%	21.21%

Dust to Dust Energy Report -- Automotive

Mercury	Mountaineer	$ 6,590.26	1.65%	20.49%
Subaru	B9 Tribeca	$ 5,466.68	1.66%	16.99%
GMC	Envoy	$ 8,604.08	1.94%	24.24%
Buick	Rainier	$ 7,174.43	1.87%	23.44%
Saab	9-7X	$ 5,272.45	1.70%	13.44%
Hummer	H3	$ 7,868.87	1.95%	24.51%
	Total Upper Mid-Range SUV	**$ 7,866.98**	**1.83%**	**19.48%**
Acura	NSX	$ 20,175.35	2.36%	22.11%
M-Benz	SC 430	$ 12,197.96	2.17%	19.06%
Cadillac	XLR	$ 13,378.72	2.49%	17.55%
Jaguar	XK	$ 17,651.10	3.07%	22.50%
Porsche	911 Carrera 4	$ 26,582.42	6.22%	30.74%
Porsche	911 Carrera	$ 29,498.60	6.57%	42.01%
M-Benz	SL Coupe/Roadster	$ 24,103.49	5.31%	14.54%
M-Benz	CL class	$ 24,567.89	5.16%	20.96%
BMW	6 Series	$ 19,295.89	4.92%	28.00%
Lotus	Lotus	$ 18,954.70	6.91%	38.93%
Dodge	Viper	$ 17,102.34	6.66%	20.22%
	Total Upper Premium Sportscars	**$ 20,318.95**	**4.71%**	**23.48%**
	Industry Average	**$ 9,527.02**	**1.99%**	**22.63%**

To put the data into **highest-to-lowest Lifetime Accident Repair** energy cost, we find expensive and limited production vehicles have a higher repair cost than lower tech models. That may not be surprising, but it is informative when discussing society's energy outlay to support particular vehicles compared to even somewhat less elaborate models.

Division	Model	Lifetime Accident Repair	Lifetime Accident Repair	Accident Repair as % Tran Prc
Volkswagen	Phaeton	$ 73,770.96	2.73%	74.20%
Maybach	Maybach	$ 65,783.41	2.21%	17.34%
Bentley	Bentley	$ 55,779.65	1.95%	32.33%
Rolls-Royce	Rolls-Royce	$ 49,764.68	1.71%	15.12%
Audi	A8	$ 43,131.43	4.06%	48.07%
Ford	GT	$ 38,638.45	8.65%	28.25%
Lexus	RX 400h	$ 36,200.15	4.77%	78.33%
Ferrar	Ferrari	$ 34,983.05	7.42%	13.71%
Audi	allroad quattro	$ 32,550.92	2.88%	71.47%
M-Benz	S class	$ 32,139.11	3.49%	25.85%
Porsche	911 Carrera	$ 29,498.60	6.57%	42.01%
Maserati	Maserati	$ 29,146.25	5.89%	25.36%
Porsche	Carrera GT	$ 29,138.08	3.46%	6.31%
Lamborghini	Lamborghini	$ 28,229.09	5.82%	14.04%
Porsche	911 Carrera 4	$ 26,582.42	6.22%	30.74%
Hummer	H1	$ 24,973.44	1.88%	18.29%
M-Benz	CL class	$ 24,567.89	5.16%	20.96%
M-Benz	SL Coupe/Roadster	$ 24,103.49	5.31%	14.54%
M-Benz	G class	$ 23,128.62	2.63%	25.05%
M-Benz	CLS class	$ 21,470.14	2.47%	34.23%
M-Benz	E class	$ 20,945.79	2.47%	33.86%
Lexus	LS 430	$ 20,794.97	1.97%	37.32%
Audi	A6	$ 20,262.07	2.16%	39.43%
Acura	NSX	$ 20,175.35	2.36%	22.11%
Jaguar	S-Type	$ 20,142.57	3.06%	44.14%
Infiniti	Q45	$ 19,359.28	2.27%	34.07%
BMW	6 Series	$ 19,295.89	4.92%	28.00%
BMW	7 Series	$ 19,237.12	3.26%	17.92%
Lotus	Lotus	$ 18,954.70	6.91%	38.93%
Land Rover	Range Rover	$ 18,510.06	2.38%	20.91%
Jaguar	XK	$ 17,651.10	3.07%	22.50%
M-Benz	CLK class	$ 17,539.82	2.63%	32.82%
Chevrolet	Suburban	$ 17,132.09	2.01%	41.70%
Dodge	Viper	$ 17,102.34	6.66%	20.22%
Aston Martin	Aston Martin	$ 17,100.17	3.62%	7.09%
Dodge	Sprinter Van	$ 16,966.27	1.84%	48.98%

Dust to Dust Energy Report -- Automotive

Ford	Excursion	$ 15,731.05	1.77%	32.55%
Ford	Expedition	$ 15,460.16	1.78%	34.71%
Lexus	GS 430	$ 15,426.31	1.93%	30.64%
Toyota	Prius	$ 15,192.48	4.29%	65.65%
GMC	Yukon XL	$ 15,108.82	1.78%	30.30%
Toyota	Highlander Hybrid	$ 15,056.71	3.92%	41.34%
Cadillac	Escalade ESV	$ 14,736.10	1.97%	20.94%
Volvo	XC90	$ 14,541.28	1.91%	31.42%
Lexus	LX 470	$ 14,512.48	2.11%	21.92%
Porsche	Cayenne	$ 14,403.20	1.80%	14.21%
Chevrolet	Corvette	$ 14,274.24	2.79%	23.70%
Chevrolet	Tahoe	$ 14,246.93	1.81%	36.80%
Toyota	Land Cruiser	$ 14,071.30	2.36%	25.88%
GMC	Yukon	$ 14,003.76	1.80%	33.27%
M-Benz	SLK class	$ 13,990.82	2.21%	31.17%
Volkswagen	Touareg	$ 13,609.87	1.77%	33.46%
Cadillac	XLR	$ 13,378.72	2.49%	17.55%
Ford	Econoline/Club Wagon	$ 13,099.65	1.89%	43.60%
Volvo	80 series	$ 12,734.95	1.91%	33.34%
BMW	5 Series	$ 12,608.61	1.94%	31.36%
GMC	Savana/G Van	$ 12,592.38	1.72%	47.75%
Cadillac	DeVille	$ 12,505.97	1.82%	30.23%
Mercury	Mariner Hybrid	$ 12,261.44	2.81%	43.44%
Ford	Escape Hybrid	$ 12,235.25	2.73%	46.22%
M-Benz	SC 430	$ 12,197.96	2.17%	19.06%
Honda	Insight	$ 12,076.18	3.77%	59.68%
Ford	F Series	$ 11,987.41	1.87%	31.86%
Ford	Econoline van	$ 11,903.36	1.93%	41.58%
Cadillac	STS	$ 11,864.68	1.73%	25.34%
Chevrolet	Avalanche	$ 11,851.34	2.56%	36.41%
Lexus	RX330	$ 11,616.49	1.83%	31.21%
GMC	Express/G Van	$ 11,492.57	1.83%	41.61%
Toyota	Sequoia	$ 11,246.50	1.75%	26.83%
Infiniti	FX45	$ 11,168.86	1.93%	22.66%
Lincoln	Town Car	$ 11,107.16	1.84%	24.53%
Cadillac	Escalade	$ 10,986.90	1.67%	18.71%
Acura	MDX	$ 10,984.51	1.98%	25.83%
Dodge	Ram pickup	$ 10,959.52	1.91%	28.38%
Cadillac	DTS	$ 10,947.77	1.66%	23.52%
Land Rover	LR3	$ 10,776.47	1.95%	22.75%
Porsche	Boxster	$ 10,679.10	2.11%	20.30%
Cadillac	Escalade EXT	$ 10,454.45	2.31%	18.37%
Honda	Accord Hybrid	$ 10,446.23	2.71%	34.57%
Hummer	H2	$ 10,314.98	1.73%	18.83%
Chevrolet	Silverado	$ 10,306.10	1.76%	31.48%
GMC	Sierra	$ 10,288.46	1.81%	29.21%
Lincoln	Navigator	$ 10,256.33	1.95%	19.72%
Cadillac	Seville	$ 10,227.61	1.91%	24.81%
M-Benz	M class	$ 10,190.34	1.91%	22.28%
BMW	Z8	$ 10,110.47	2.09%	20.11%

Dust to Dust Energy Report -- Automotive

Nissan	Armada	$ 9,947.62	1.78%	25.03%
Chevrolet	Classic	$ 9,820.35	1.89%	50.02%
Infiniti	FX35	$ 9,747.71	1.86%	24.86%
Land Rover	Range Rover Sport	$ 9,722.76	1.95%	14.86%
Infiniti	M45	$ 9,718.76	1.99%	21.29%
Honda	Civic Hybrid	$ 9,439.12	2.58%	39.95%
Dodge	Ram Van	$ 9,263.01	1.80%	36.15%
	Industry Average	**$ 9,231.27**	**2.10%**	**23.60%**
Land Rover	Discovery	$ 9,226.18	1.80%	20.80%
Cadillac	SRX	$ 9,087.62	1.91%	20.69%
Jaguar	XJ	$ 9,068.07	2.01%	11.69%
Lexus	GS 300	$ 8,953.21	1.77%	20.16%
Lexus	GX 470	$ 8,891.87	1.87%	20.11%
Ford	Freestyle/Windstar	$ 8,842.74	1.73%	32.62%
GMC	Envoy	$ 8,604.08	1.94%	24.24%
Chrysler	Pacifica	$ 8,597.56	1.69%	28.45%
Dodge	Stratus	$ 8,572.41	1.97%	44.13%
Volvo	50 series	$ 8,567.89	1.87%	30.00%
Toyota	Tundra	$ 8,482.18	1.77%	27.66%
Mitsubishi	Outlander	$ 8,253.09	1.99%	36.42%
Lincoln	Aviator	$ 8,248.37	1.84%	21.21%
Honda	Accord	$ 8,246.28	1.81%	28.27%
M-Benz	R class	$ 8,156.34	1.68%	15.88%
Chevrolet	HHR	$ 7,939.82	1.96%	44.32%
Saturn	L series	$ 7,895.29	1.90%	40.55%
Hummer	H3	$ 7,868.87	1.95%	24.51%
Pontiac	Grand Am	$ 7,857.16	1.84%	35.80%
Volkswagen	Golf GTI	$ 7,796.93	1.96%	31.42%
Mercury	Milan	$ 7,783.30	1.87%	36.11%
Nissan	Titan	$ 7,776.33	1.71%	24.74%
BMW	Z4	$ 7,774.48	2.13%	20.13%
Honda	Odyssey	$ 7,746.90	1.78%	22.35%
Acura	RL	$ 7,745.86	1.71%	15.08%
BMW	M3	$ 7,721.06	1.98%	16.46%
Nissan	Murano	$ 7,594.47	1.70%	25.12%
Volvo	70 series	$ 7,577.07	1.65%	19.98%
Ford	Fusion	$ 7,484.02	1.77%	36.99%
Pontiac	Montana SV6	$ 7,397.23	1.99%	28.77%
Buick	LaCrosse	$ 7,371.20	1.99%	26.40%
Honda	Civic	$ 7,366.47	1.71%	33.01%
Acura	CL	$ 7,359.46	2.00%	22.56%
Nissan	Xterra	$ 7,336.33	1.90%	29.91%
Volkswagen	EuroVan/T4	$ 7,294.94	2.00%	19.86%
Buick	Terraza	$ 7,283.94	1.84%	22.45%
Dodge	Magnum	$ 7,279.16	1.97%	25.69%
Chrysler	300/300M	$ 7,268.36	1.93%	23.64%
Mercury	Zephyr	$ 7,232.21	1.84%	25.15%
Buick	Rainier	$ 7,174.43	1.87%	23.44%
Buick	Rendezvous	$ 7,153.57	1.78%	25.88%
Audi	TT	$ 7,142.72	1.83%	17.24%

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Lincoln	Mark LT	$	7,127.34	1.91%	17.63%
BMW	X5	$	7,114.54	1.81%	10.48%
Toyota	4Runner	$	7,103.05	1.84%	19.26%
Volkswagen	Passat	$	7,091.77	1.80%	23.59%
BMW	X3	$	7,071.22	1.87%	21.28%
Toyota	Camry	$	7,040.88	1.82%	26.64%
Audi	S4	$	7,029.06	2.17%	12.47%
Chevrolet	Astro	$	6,964.86	1.97%	28.11%
Volkswagen	Golf	$	6,882.47	1.69%	31.79%
Chevrolet	Venture	$	6,860.47	1.85%	28.21%
Toyota	Highlander	$	6,835.48	1.76%	23.19%
Isuzu	Trooper	$	6,781.56	1.70%	25.57%
Chevrolet	Equinox	$	6,781.30	1.97%	27.94%
Acura	TL	$	6,749.90	1.86%	19.76%
Chrysler	Town & Country	$	6,637.88	1.75%	19.28%
GMC	Safari	$	6,620.02	1.90%	28.61%
Infiniti	I30/I35	$	6,610.94	1.90%	22.15%
Mercury	Mountaineer	$	6,590.26	1.65%	20.49%
Mitsubishi	Montero	$	6,561.42	1.92%	19.17%
Infiniti	QX4	$	6,561.29	1.75%	15.36%
Pontiac	G6	$	6,554.16	1.76%	32.28%
Ford	Five Hundred	$	6,525.88	1.88%	28.14%
Toyota	Avalon	$	6,524.70	1.65%	21.50%
Nissan	Pathfinder	$	6,489.45	1.85%	19.72%
Mazda	Tribute	$	6,428.96	1.90%	27.76%
Pontiac	Torrent	$	6,395.66	2.00%	27.77%
Saturn	Relay	$	6,388.06	1.84%	23.36%
Dodge	Intrepid	$	6,340.68	2.01%	32.31%
Volvo	60 series	$	6,282.56	1.72%	17.67%
Nissan	Quest	$	6,268.66	1.85%	19.92%
Nissan	Maxima	$	6,259.54	1.65%	22.27%
Mercury	Montego	$	6,227.55	1.81%	22.62%
Dodge	Caravan/Grand Caravan	$	6,223.32	1.74%	23.77%
Ford	Freestar	$	6,194.95	1.86%	27.86%
Mercury	Monterey	$	6,019.31	1.83%	22.07%
Mitsubishi	Endeavor	$	6,010.15	1.99%	18.93%
Hyundai	Santa Fe	$	5,975.81	1.96%	24.02%
Ford	Escape	$	5,966.30	1.90%	25.25%
Toyota	RAV4	$	5,964.25	1.89%	25.22%
Chevrolet	Uplander	$	5,945.38	1.80%	18.34%
Pontiac	Montana	$	5,938.98	1.67%	23.37%
Jeep	Grand Cherokee SRT-8	$	5,932.88	1.92%	14.15%
Pontiac	Bonneville	$	5,902.67	1.81%	20.63%
Jaguar	X-Type	$	5,902.24	1.83%	17.82%
Buick	Lucerne	$	5,836.62	1.83%	17.69%
Mitsubishi	Montero Sport	$	5,788.67	1.92%	19.68%
Toyota	Sienna	$	5,786.94	1.68%	16.65%
Pontiac	Solstice	$	5,782.23	2.01%	27.06%
Ford	Taurus	$	5,780.00	1.94%	29.29%
Kia	Optima	$	5,778.18	1.80%	32.91%

Subaru	Legacy	$	5,769.03	2.00%	19.61%
Mazda	RX8	$	5,762.05	1.67%	21.07%
Chevrolet	SSR	$	5,761.32	1.65%	17.83%
Honda	Pilot	$	5,758.71	1.68%	18.03%
Hyundai	Tucson	$	5,756.93	1.78%	25.67%
Nissan	350Z	$	5,712.28	1.67%	15.77%
Chevrolet	Malibu	$	5,692.89	1.82%	25.37%
Acura	TSX	$	5,685.09	1.95%	19.78%
Lexus	ES 330	$	5,670.06	1.78%	17.98%
Jeep	Commander	$	5,667.37	1.78%	15.41%
Ford	Mustang	$	5,663.91	1.78%	20.41%
Mazda	MPV	$	5,635.26	1.85%	20.77%
Subaru	Forester	$	5,632.54	1.87%	21.39%
Saab	9-3	$	5,627.57	1.89%	18.67%
Infiniti	G35	$	5,624.29	1.84%	17.17%
Mercury	Sable	$	5,614.45	1.93%	28.26%
Lexus	IS 300	$	5,611.82	1.89%	16.16%
Dodge	Charger	$	5,601.43	1.65%	22.68%
M-Benz	C class	$	5,521.15	1.90%	14.32%
Hyundai	Sonata	$	5,516.68	1.72%	27.94%
Subaru	Baja	$	5,515.23	1.84%	23.16%
Volkswagen	Beetle	$	5,501.37	1.76%	27.65%
Mercury	Mariner	$	5,471.72	1.86%	22.85%
Subaru	B9 Tribeca	$	5,466.68	1.66%	16.99%
Mitsubishi	Diamante	$	5,455.40	1.87%	20.58%
Mini	Mini Cooper S	$	5,436.39	1.77%	25.47%
Audi	A4/S4	$	5,426.33	1.81%	14.87%
Subaru	Outback	$	5,413.84	1.92%	17.39%
Saturn	Vue	$	5,413.05	1.82%	24.37%
Mini	Mini Cooper	$	5,400.62	1.78%	24.90%
Lincoln	LS	$	5,380.99	1.71%	15.07%
Volvo	40 series	$	5,346.31	1.74%	21.04%
Chrysler	PT Cruiser	$	5,292.41	1.71%	22.88%
Mazda	Mazda5	$	5,284.25	1.84%	28.19%
Jeep	Grand Cherokee	$	5,280.13	1.69%	13.19%
Saab	9-7X	$	5,272.45	1.70%	13.44%
Chevrolet	Monte Carlo	$	5,266.38	1.85%	19.61%
Pontiac	GTO	$	5,241.77	1.80%	19.04%
BMW	330	$	5,206.05	1.83%	14.76%
Suzuki	Verona	$	5,190.48	1.79%	27.69%
Acura	RSX	$	5,156.53	1.70%	22.86%
Chrysler	Concorde	$	5,155.92	1.84%	19.40%
Saab	9-2	$	5,150.50	1.94%	19.99%
Volkswagen	Jetta wagon	$	5,120.23	1.84%	23.57%
Subaru	Impreza	$	5,120.03	1.68%	21.68%
Isuzu	Rodeo	$	5,105.54	1.80%	26.22%
Mazda	Mazda6	$	5,092.46	1.75%	19.91%
BMW	325	$	5,078.04	1.94%	13.77%
Ford	Thunderbird	$	5,075.69	2.01%	13.99%
Chevrolet	TrailBlazer	$	5,047.02	1.98%	18.54%

Dust to Dust Energy Report -- Automotive

Toyota	Celica	$	5,007.45	1.83%	23.15%
Cadillac	CTS	$	5,000.99	1.86%	15.75%
Ford	Crown Victoria	$	4,986.18	1.66%	21.44%
Mercury	Grand Marquis	$	4,960.00	1.69%	19.27%
Chevrolet	Blazer	$	4,954.38	1.83%	24.44%
Hyundai	Tiburon	$	4,944.50	1.79%	28.03%
Dodge	Durango	$	4,941.92	1.88%	15.63%
Land Rover	Freelander	$	4,893.27	1.85%	19.29%
Mitsubishi	Eclipse	$	4,888.24	1.68%	23.10%
Pontiac	Aztek	$	4,869.54	1.88%	21.93%
Honda	Ridgeline	$	4,860.14	1.65%	16.12%
Buick	Park Avenue	$	4,847.11	1.74%	12.63%
Ford	Explorer	$	4,843.82	1.70%	15.42%
Audi	A3	$	4,836.76	1.66%	15.96%
Suzuki	XL-7	$	4,825.30	1.98%	19.09%
Toyota	MR2 Spyder	$	4,797.57	1.76%	20.80%
Mazda	626	$	4,705.15	1.97%	23.48%
Buick	LeSabre	$	4,645.53	1.85%	18.65%
Kia	Sedona	$	4,622.54	1.68%	18.59%
Mazda	MX-5 Miata	$	4,576.80	1.71%	18.72%
Honda	CR-V	$	4,541.32	1.97%	18.53%
Honda	S2000	$	4,501.73	1.91%	14.60%
Suzuki	Grand Vitara	$	4,497.85	1.86%	19.02%
Volkswagen	Jetta	$	4,470.55	1.68%	18.99%
Isuzu	Ascender	$	4,387.47	1.78%	16.54%
Chevrolet	Camaro	$	4,326.12	1.88%	16.87%
Pontiac	Firebird	$	4,319.50	1.94%	17.40%
Saab	9-5	$	4,310.67	1.74%	12.16%
Honda	Element	$	4,309.80	1.68%	21.83%
Mitsubishi	Eclipse Spyder	$	4,304.81	1.74%	13.82%
Buick	Century	$	4,303.57	1.70%	21.86%
Isuzu	Axiom	$	4,237.38	1.72%	14.73%
GMC	Canyon	$	4,222.18	1.75%	19.75%
Mitsubishi	Galant	$	4,213.80	1.88%	17.21%
Pontiac	Grand Prix	$	4,173.98	1.77%	15.73%
Jeep	Liberty	$	4,092.91	1.97%	15.69%
Mazda	Millenia	$	4,092.53	1.67%	14.81%
GMC	Sonoma	$	4,079.73	1.70%	18.49%
Chevrolet	Impala	$	3,966.69	1.68%	15.61%
Chevrolet	Colorado	$	3,911.58	1.89%	17.53%
Toyota	Tacoma	$	3,908.69	1.97%	23.14%
Chrysler	Sebring	$	3,872.60	1.84%	20.94%
Nissan	Altima	$	3,846.27	1.82%	15.21%
Mitsubishi	Raider	$	3,836.68	1.95%	12.94%
Hyundai	XG350	$	3,629.31	1.87%	15.70%
Ford	Ranger	$	3,623.19	1.99%	18.73%
Nissan	Frontier	$	3,609.81	1.82%	15.20%
Suzuki	Vitara	$	3,594.29	1.81%	18.98%
Isuzu	Rodeo Sport	$	3,512.36	1.77%	17.96%
Mazda	B-Series	$	3,486.45	1.66%	16.03%

Dust to Dust Energy Report -- Automotive

Kia	Amanti	$ 3,437.29	1.68%	15.03%
Kia	Sportage	$ 3,362.76	1.81%	15.93%
Chrysler	Crossfire	$ 3,362.52	1.94%	10.77%
Dodge	Dakota	$ 3,348.17	1.92%	13.52%
Kia	Sorento	$ 3,302.45	1.75%	13.52%
Buick	Regal	$ 3,262.51	1.84%	13.87%
Chevrolet	Cobalt	$ 3,236.02	1.89%	19.27%
Pontiac	Vibe	$ 3,207.87	1.97%	17.38%
Mazda	Mazda3	$ 3,197.50	1.99%	19.53%
Toyota	Matrix **	$ 3,113.11	1.90%	17.87%
Nissan	Sentra	$ 2,714.51	1.72%	17.00%
Kia	Rio	$ 2,654.96	1.70%	20.51%
Hyundai	Accent	$ 2,587.02	2.01%	20.42%
Suzuki	Aerio	$ 2,584.40	1.83%	17.10%
Mitsubishi	Lancer	$ 2,499.17	1.86%	14.93%
Mazda	Protégé	$ 2,487.00	2.00%	17.00%
Ford	Focus	$ 2,387.83	1.76%	14.58%
Chevrolet	S10	$ 2,372.29	1.77%	12.97%
Hyundai	Elantra	$ 2,355.12	2.01%	15.36%
Kia	Spectra	$ 2,252.84	1.65%	14.40%
Toyota	Corolla	$ 2,189.96	1.77%	13.80%
Scion	xA	$ 2,180.16	1.90%	16.58%
Chevrolet	Cavalier	$ 2,175.82	1.89%	13.88%
Jeep	Wrangler	$ 2,175.47	1.74%	8.57%
Pontiac	Sunfire	$ 2,152.97	1.81%	13.52%
Suzuki	Forenza	$ 2,089.11	1.74%	12.96%
Scion	tC	$ 2,066.02	1.76%	12.19%
Ford	Escort	$ 1,996.30	1.83%	13.75%
Chevrolet	Aveo	$ 1,987.28	1.83%	15.74%
Dodge	Neon	$ 1,960.77	1.82%	12.71%
Saturn	Ion	$ 1,905.73	1.67%	12.70%
Toyota	Echo	$ 1,865.01	1.69%	16.63%
Chevrolet	Tracker	$ 1,794.65	1.69%	9.67%
Scion	xB	$ 1,589.51	1.76%	10.62%

Over the life of a vehicle sold in the U.S. in 2005 and early 2006, the most expensive in terms of share of original Transaction Price is the Lexus RX 400h. That is, the energy cost to fix this model will be equivalent to 78 percent of the original price just in energy requirements related to accident repair.

At the other end of the list, taking up barely 7 percent of original transaction price is the Porsche Carrera GT. Why so little? Look at the original Transaction Price and add into that the fact it is a rare instance when Porsche's of this type are involved in serious accidents.

Division	Model	Lifetime Accident Repair	Lifetime Accident Repair	Accident Repair as % Tran Prc
Lexus	RX 400h	$ 36,200.15	4.77%	78.33%
Volkswagen	Phaeton	$ 73,770.96	2.73%	74.20%
Audi	allroad quattro	$ 32,550.92	2.88%	71.47%
Toyota	Prius	$ 15,192.48	4.29%	65.65%
Honda	Insight	$ 12,076.18	3.77%	59.68%
Chevrolet	Classic	$ 9,820.35	1.89%	50.02%
Dodge	Sprinter Van	$ 16,966.27	1.84%	48.98%
Audi	A8	$ 43,131.43	4.06%	48.07%
GMC	Savana/G Van	$ 12,592.38	1.72%	47.75%
Ford	Escape Hybrid	$ 12,235.25	2.73%	46.22%
Chevrolet	HHR	$ 7,939.82	1.96%	44.32%
Jaguar	S-Type	$ 20,142.57	3.06%	44.14%
Dodge	Stratus	$ 8,572.41	1.97%	44.13%
Ford	Econoline/Club Wagon	$ 13,099.65	1.89%	43.60%
Mercury	Mariner Hybrid	$ 12,261.44	2.81%	43.44%
Porsche	911 Carrera	$ 29,498.60	6.57%	42.01%
Chevrolet	Suburban	$ 17,132.09	2.01%	41.70%
GMC	Express/G Van	$ 11,492.57	1.83%	41.61%
Ford	Econoline van	$ 11,903.36	1.93%	41.58%
Toyota	Highlander Hybrid	$ 15,056.71	3.92%	41.34%
Saturn	L series	$ 7,895.29	1.90%	40.55%
Honda	Civic Hybrid	$ 9,439.12	2.58%	39.95%
Audi	A6	$ 20,262.07	2.16%	39.43%
Lotus	Lotus	$ 18,954.70	6.91%	38.93%
Lexus	LS 430	$ 20,794.97	1.97%	37.32%
Ford	Fusion	$ 7,484.02	1.77%	36.99%
Chevrolet	Tahoe	$ 14,246.93	1.81%	36.80%
Mitsubishi	Outlander	$ 8,253.09	1.99%	36.42%
Chevrolet	Avalanche	$ 11,851.34	2.56%	36.41%
Dodge	Ram Van	$ 9,263.01	1.80%	36.15%
Mercury	Milan	$ 7,783.30	1.87%	36.11%
Pontiac	Grand Am	$ 7,857.16	1.84%	35.80%
Ford	Expedition	$ 15,460.16	1.78%	34.71%
Honda	Accord Hybrid	$ 10,446.23	2.71%	34.57%
M-Benz	CLS class	$ 21,470.14	2.47%	34.23%
Infiniti	Q45	$ 19,359.28	2.27%	34.07%
M-Benz	E class	$ 20,945.79	2.47%	33.86%
Volkswagen	Touareg	$ 13,609.87	1.77%	33.46%
Volvo	80 series	$ 12,734.95	1.91%	33.34%
GMC	Yukon	$ 14,003.76	1.80%	33.27%
Honda	Civic	$ 7,366.47	1.71%	33.01%
Kia	Optima	$ 5,778.18	1.80%	32.91%
M-Benz	CLK class	$ 17,539.82	2.63%	32.82%
Ford	Freestyle/Windstar	$ 8,842.74	1.73%	32.62%

Dust to Dust Energy Report -- Automotive

Ford	Excursion	$ 15,731.05	1.77%	32.55%
Bentley	Bentley	$ 55,779.65	1.95%	32.33%
Dodge	Intrepid	$ 6,340.68	2.01%	32.31%
Pontiac	G6	$ 6,554.16	1.76%	32.28%
Ford	F Series	$ 11,987.41	1.87%	31.86%
Volkswagen	Golf	$ 6,882.47	1.69%	31.79%
Chevrolet	Silverado	$ 10,306.10	1.76%	31.48%
Volkswagen	Golf GTI	$ 7,796.93	1.96%	31.42%
Volvo	XC90	$ 14,541.28	1.91%	31.42%
BMW	5 Series	$ 12,608.61	1.94%	31.36%
Lexus	RX330	$ 11,616.49	1.83%	31.21%
M-Benz	SLK class	$ 13,990.82	2.21%	31.17%
Porsche	911 Carrera 4	$ 26,582.42	6.22%	30.74%
Lexus	GS 430	$ 15,426.31	1.93%	30.64%
GMC	Yukon XL	$ 15,108.82	1.78%	30.30%
Cadillac	DeVille	$ 12,505.97	1.82%	30.23%
Volvo	50 series	$ 8,567.89	1.87%	30.00%
Nissan	Xterra	$ 7,336.33	1.90%	29.91%
Ford	Taurus	$ 5,780.00	1.94%	29.29%
GMC	Sierra	$ 10,288.46	1.81%	29.21%
Pontiac	Montana SV6	$ 7,397.23	1.99%	28.77%
GMC	Safari	$ 6,620.02	1.90%	28.61%
Chrysler	Pacifica	$ 8,597.56	1.69%	28.45%
Dodge	Ram pickup	$ 10,959.52	1.91%	28.38%
Honda	Accord	$ 8,246.28	1.81%	28.27%
Mercury	Sable	$ 5,614.45	1.93%	28.26%
Ford	GT	$ 38,638.45	8.65%	28.25%
Chevrolet	Venture	$ 6,860.47	1.85%	28.21%
Mazda	Mazda5	$ 5,284.25	1.84%	28.19%
Ford	Five Hundred	$ 6,525.88	1.88%	28.14%
Chevrolet	Astro	$ 6,964.86	1.97%	28.11%
Hyundai	Tiburon	$ 4,944.50	1.79%	28.03%
BMW	6 Series	$ 19,295.89	4.92%	28.00%
Hyundai	Sonata	$ 5,516.68	1.72%	27.94%
Chevrolet	Equinox	$ 6,781.30	1.97%	27.94%
Ford	Freestar	$ 6,194.95	1.86%	27.86%
Pontiac	Torrent	$ 6,395.66	2.00%	27.77%
Mazda	Tribute	$ 6,428.96	1.90%	27.76%
Suzuki	Verona	$ 5,190.48	1.79%	27.69%
Toyota	Tundra	$ 8,482.18	1.77%	27.66%
Volkswagen	Beetle	$ 5,501.37	1.76%	27.65%
Pontiac	Solstice	$ 5,782.23	2.01%	27.06%
Toyota	Sequoia	$ 11,246.50	1.75%	26.83%
Toyota	Camry	$ 7,040.88	1.82%	26.64%
Buick	LaCrosse	$ 7,371.20	1.99%	26.40%
Isuzu	Rodeo	$ 5,105.54	1.80%	26.22%
Buick	Rendezvous	$ 7,153.57	1.78%	25.88%
Toyota	Land Cruiser	$ 14,071.30	2.36%	25.88%
M-Benz	S class	$ 32,139.11	3.49%	25.85%
Acura	MDX	$ 10,984.51	1.98%	25.83%

Dodge	Magnum	$	7,279.16	1.97%	25.69%
Hyundai	Tucson	$	5,756.93	1.78%	25.67%
Isuzu	Trooper	$	6,781.56	1.70%	25.57%
Mini	Mini Cooper S	$	5,436.39	1.77%	25.47%
Chevrolet	Malibu	$	5,692.89	1.82%	25.37%
Maserati	Maserati	$	29,146.25	5.89%	25.36%
Cadillac	STS	$	11,864.68	1.73%	25.34%
Ford	Escape	$	5,966.30	1.90%	25.25%
Toyota	RAV4	$	5,964.25	1.89%	25.22%
Mercury	Zephyr	$	7,232.21	1.84%	25.15%
Nissan	Murano	$	7,594.47	1.70%	25.12%
M-Benz	G class	$	23,128.62	2.63%	25.05%
Nissan	Armada	$	9,947.62	1.78%	25.03%
Mini	Mini Cooper	$	5,400.62	1.78%	24.90%
Infiniti	FX35	$	9,747.71	1.86%	24.86%
Cadillac	Seville	$	10,227.61	1.91%	24.81%
Nissan	Titan	$	7,776.33	1.71%	24.74%
Lincoln	Town Car	$	11,107.16	1.84%	24.53%
Hummer	H3	$	7,868.87	1.95%	24.51%
Chevrolet	Blazer	$	4,954.38	1.83%	24.44%
Saturn	Vue	$	5,413.05	1.82%	24.37%
GMC	Envoy	$	8,604.08	1.94%	24.24%
Hyundai	Santa Fe	$	5,975.81	1.96%	24.02%
Dodge	Caravan/Grand Caravan	$	6,223.32	1.74%	23.77%
Chevrolet	Corvette	$	14,274.24	2.79%	23.70%
Chrysler	300/300M	$	7,268.36	1.93%	23.64%
Volkswagen	Passat	$	7,091.77	1.80%	23.59%
Volkswagen	Jetta wagon	$	5,120.23	1.84%	23.57%
Cadillac	DTS	$	10,947.77	1.66%	23.52%
Mazda	626	$	4,705.15	1.97%	23.48%
Buick	Rainier	$	7,174.43	1.87%	23.44%
Pontiac	Montana	$	5,938.98	1.67%	23.37%
Saturn	Relay	$	6,388.06	1.84%	23.36%
Toyota	Highlander	$	6,835.48	1.76%	23.19%
Subaru	Baja	$	5,515.23	1.84%	23.16%
Toyota	Celica	$	5,007.45	1.83%	23.15%
Toyota	Tacoma	$	3,908.69	1.97%	23.14%
Mitsubishi	Eclipse	$	4,888.24	1.68%	23.10%
Chrysler	PT Cruiser	$	5,292.41	1.71%	22.88%
Acura	RSX	$	5,156.53	1.70%	22.86%
Mercury	Mariner	$	5,471.72	1.86%	22.85%
Land Rover	LR3	$	10,776.47	1.95%	22.75%
Dodge	Charger	$	5,601.43	1.65%	22.68%
Infiniti	FX45	$	11,168.86	1.93%	22.66%
Mercury	Montego	$	6,227.55	1.81%	22.62%
Acura	CL	$	7,359.46	2.00%	22.56%
Jaguar	XK	$	17,651.10	3.07%	22.50%
Buick	Terraza	$	7,283.94	1.84%	22.45%
Honda	Odyssey	$	7,746.90	1.78%	22.35%
M-Benz	M class	$	10,190.34	1.91%	22.28%

Nissan	Maxima	$ 6,259.54	1.65%	22.27%
Infiniti	I30/I35	$ 6,610.94	1.90%	22.15%
Acura	NSX	$ 20,175.35	2.36%	22.11%
Mercury	Monterey	$ 6,019.31	1.83%	22.07%
Pontiac	Aztek	$ 4,869.54	1.88%	21.93%
Lexus	LX 470	$ 14,512.48	2.11%	21.92%
Buick	Century	$ 4,303.57	1.70%	21.86%
Honda	Element	$ 4,309.80	1.68%	21.83%
Subaru	Impreza	$ 5,120.03	1.68%	21.68%
Toyota	Avalon	$ 6,524.70	1.65%	21.50%
Ford	Crown Victoria	$ 4,986.18	1.66%	21.44%
Subaru	Forester	$ 5,632.54	1.87%	21.39%
Infiniti	M45	$ 9,718.76	1.99%	21.29%
BMW	X3	$ 7,071.22	1.87%	21.28%
Lincoln	Aviator	$ 8,248.37	1.84%	21.21%
Mazda	RX8	$ 5,762.05	1.67%	21.07%
Volvo	40 series	$ 5,346.31	1.74%	21.04%
M-Benz	CL class	$ 24,567.89	5.16%	20.96%
Cadillac	Escalade ESV	$ 14,736.10	1.97%	20.94%
Chrysler	Sebring	$ 3,872.60	1.84%	20.94%
Land Rover	Range Rover	$ 18,510.06	2.38%	20.91%
Land Rover	Discovery	$ 9,226.18	1.80%	20.80%
Toyota	MR2 Spyder	$ 4,797.57	1.76%	20.80%
Mazda	MPV	$ 5,635.26	1.85%	20.77%
Cadillac	SRX	$ 9,087.62	1.91%	20.69%
Pontiac	Bonneville	$ 5,902.67	1.81%	20.63%
Mitsubishi	Diamante	$ 5,455.40	1.87%	20.58%
Kia	Rio	$ 2,654.96	1.70%	20.51%
Mercury	Mountaineer	$ 6,590.26	1.65%	20.49%
Hyundai	Accent	$ 2,587.02	2.01%	20.42%
Ford	Mustang	$ 5,663.91	1.78%	20.41%
Porsche	Boxster	$ 10,679.10	2.11%	20.30%
Dodge	Viper	$ 17,102.34	6.66%	20.22%
Lexus	GS 300	$ 8,953.21	1.77%	20.16%
BMW	Z4	$ 7,774.48	2.13%	20.13%
BMW	Z8	$ 10,110.47	2.09%	20.11%
Lexus	GX 470	$ 8,891.87	1.87%	20.11%
Saab	9-2	$ 5,150.50	1.94%	19.99%
Volvo	70 series	$ 7,577.07	1.65%	19.98%
Nissan	Quest	$ 6,268.66	1.85%	19.92%
Mazda	Mazda6	$ 5,092.46	1.75%	19.91%
Volkswagen	EuroVan/T4	$ 7,294.94	2.00%	19.86%
Acura	TSX	$ 5,685.09	1.95%	19.78%
Acura	TL	$ 6,749.90	1.86%	19.76%
GMC	Canyon	$ 4,222.18	1.75%	19.75%
Lincoln	Navigator	$ 10,256.33	1.95%	19.72%
Nissan	Pathfinder	$ 6,489.45	1.85%	19.72%
Mitsubishi	Montero Sport	$ 5,788.67	1.92%	19.68%
Subaru	Legacy	$ 5,769.03	2.00%	19.61%
Chevrolet	Monte Carlo	$ 5,266.38	1.85%	19.61%

Mazda	Mazda3	$	3,197.50	1.99%	19.53%
Chrysler	Concorde	$	5,155.92	1.84%	19.40%
Land Rover	Freelander	$	4,893.27	1.85%	19.29%
Chrysler	Town & Country	$	6,637.88	1.75%	19.28%
Chevrolet	Cobalt	$	3,236.02	1.89%	19.27%
Mercury	Grand Marquis	$	4,960.00	1.69%	19.27%
Toyota	4Runner	$	7,103.05	1.84%	19.26%
Mitsubishi	Montero	$	6,561.42	1.92%	19.17%
Suzuki	XL-7	$	4,825.30	1.98%	19.09%
M-Benz	SC 430	$	12,197.96	2.17%	19.06%
Pontiac	GTO	$	5,241.77	1.80%	19.04%
Suzuki	Grand Vitara	$	4,497.85	1.86%	19.02%
Volkswagen	Jetta	$	4,470.55	1.68%	18.99%
Suzuki	Vitara	$	3,594.29	1.81%	18.98%
Mitsubishi	Endeavor	$	6,010.15	1.99%	18.93%
Hummer	H2	$	10,314.98	1.73%	18.83%
Ford	Ranger	$	3,623.19	1.99%	18.73%
Mazda	MX-5 Miata	$	4,576.80	1.71%	18.72%
Cadillac	Escalade	$	10,986.90	1.67%	18.71%
Saab	9-3	$	5,627.57	1.89%	18.67%
Buick	LeSabre	$	4,645.53	1.85%	18.65%
Kia	Sedona	$	4,622.54	1.68%	18.59%
Chevrolet	TrailBlazer	$	5,047.02	1.98%	18.54%
Honda	CR-V	$	4,541.32	1.97%	18.53%
GMC	Sonoma	$	4,079.73	1.70%	18.49%
Cadillac	Escalade EXT	$	10,454.45	2.31%	18.37%
Chevrolet	Uplander	$	5,945.38	1.80%	18.34%
Hummer	H1	$	24,973.44	1.88%	18.29%
Honda	Pilot	$	5,758.71	1.68%	18.03%
Lexus	ES 330	$	5,670.06	1.78%	17.98%
Isuzu	Rodeo Sport	$	3,512.36	1.77%	17.96%
BMW	7 Series	$	19,237.12	3.26%	17.92%
Toyota	Matrix **	$	3,113.11	1.90%	17.87%
Chevrolet	SSR	$	5,761.32	1.65%	17.83%
Jaguar	X-Type	$	5,902.24	1.83%	17.82%
Buick	Lucerne	$	5,836.62	1.83%	17.69%
Volvo	60 series	$	6,282.56	1.72%	17.67%
Lincoln	Mark LT	$	7,127.34	1.91%	17.63%
Cadillac	XLR	$	13,378.72	2.49%	17.55%
Chevrolet	Colorado	$	3,911.58	1.89%	17.53%
Pontiac	Firebird	$	4,319.50	1.94%	17.40%
Subaru	Outback	$	5,413.84	1.92%	17.39%
Pontiac	Vibe	$	3,207.87	1.97%	17.38%
Maybach	Maybach	$	65,783.41	2.21%	17.34%
Audi	TT	$	7,142.72	1.83%	17.24%
Mitsubishi	Galant	$	4,213.80	1.88%	17.21%
Infiniti	G35	$	5,624.29	1.84%	17.17%
Suzuki	Aerio	$	2,584.40	1.83%	17.10%
Mazda	Protégé	$	2,487.00	2.00%	17.00%
Nissan	Sentra	$	2,714.51	1.72%	17.00%

Subaru	B9 Tribeca	$ 5,466.68	1.66%	16.99%
Chevrolet	Camaro	$ 4,326.12	1.88%	16.87%
Toyota	Sienna	$ 5,786.94	1.68%	16.65%
Toyota	Echo	$ 1,865.01	1.69%	16.63%
Scion	xA	$ 2,180.16	1.90%	16.58%
Isuzu	Ascender	$ 4,387.47	1.78%	16.54%
BMW	M3	$ 7,721.06	1.98%	16.46%
Lexus	IS 300	$ 5,611.82	1.89%	16.16%
Honda	Ridgeline	$ 4,860.14	1.65%	16.12%
Mazda	B-Series	$ 3,486.45	1.66%	16.03%
Audi	A3	$ 4,836.76	1.66%	15.96%
Kia	Sportage	$ 3,362.76	1.81%	15.93%
M-Benz	R class	$ 8,156.34	1.68%	15.88%
Nissan	350Z	$ 5,712.28	1.67%	15.77%
Cadillac	CTS	$ 5,000.99	1.86%	15.75%
Chevrolet	Aveo	$ 1,987.28	1.83%	15.74%
Pontiac	Grand Prix	$ 4,173.98	1.77%	15.73%
Hyundai	XG350	$ 3,629.31	1.87%	15.70%
Jeep	Liberty	$ 4,092.91	1.97%	15.69%
Dodge	Durango	$ 4,941.92	1.88%	15.63%
Chevrolet	Impala	$ 3,966.69	1.68%	15.61%
Ford	Explorer	$ 4,843.82	1.70%	15.42%
Jeep	Commander	$ 5,667.37	1.78%	15.41%
Infiniti	QX4	$ 6,561.29	1.75%	15.36%
Hyundai	Elantra	$ 2,355.12	2.01%	15.36%
Nissan	Altima	$ 3,846.27	1.82%	15.21%
Nissan	Frontier	$ 3,609.81	1.82%	15.20%
Rolls-Royce	Rolls-Royce	$ 49,764.68	1.71%	15.12%
Acura	RL	$ 7,745.86	1.71%	15.08%
Lincoln	LS	$ 5,380.99	1.71%	15.07%
Kia	Amanti	$ 3,437.29	1.68%	15.03%
Mitsubishi	Lancer	$ 2,499.17	1.86%	14.93%
Audi	A4/S4	$ 5,426.33	1.81%	14.87%
Land Rover	Range Rover Sport	$ 9,722.76	1.95%	14.86%
Mazda	Millenia	$ 4,092.53	1.67%	14.81%
BMW	330	$ 5,206.05	1.83%	14.76%
Isuzu	Axiom	$ 4,237.38	1.72%	14.73%
Honda	S2000	$ 4,501.73	1.91%	14.60%
Ford	Focus	$ 2,387.83	1.76%	14.58%
M-Benz	SL Coupe/Roadster	$ 24,103.49	5.31%	14.54%
Kia	Spectra	$ 2,252.84	1.65%	14.40%
M-Benz	C class	$ 5,521.15	1.90%	14.32%
Porsche	Cayenne	$ 14,403.20	1.80%	14.21%
Jeep	Grand Cherokee SRT-8	$ 5,932.88	1.92%	14.15%
Lamborghini	Lamborghini	$ 28,229.09	5.82%	14.04%
Ford	Thunderbird	$ 5,075.69	2.01%	13.99%
Chevrolet	Cavalier	$ 2,175.82	1.89%	13.88%
Buick	Regal	$ 3,262.51	1.84%	13.87%
Mitsubishi	Eclipse Spyder	$ 4,304.81	1.74%	13.82%
Toyota	Corolla	$ 2,189.96	1.77%	13.80%

BMW	325	$ 5,078.04	1.94%	13.77%
Ford	Escort	$ 1,996.30	1.83%	13.75%
Ferrar	Ferrari	$ 34,983.05	7.42%	13.71%
Kia	Sorento	$ 3,302.45	1.75%	13.52%
Pontiac	Sunfire	$ 2,152.97	1.81%	13.52%
Dodge	Dakota	$ 3,348.17	1.92%	13.52%
Saab	9-7X	$ 5,272.45	1.70%	13.44%
Jeep	Grand Cherokee	$ 5,280.13	1.69%	13.19%
Chevrolet	S10	$ 2,372.29	1.77%	12.97%
Suzuki	Forenza	$ 2,089.11	1.74%	12.96%
Mitsubishi	Raider	$ 3,836.68	1.95%	12.94%
Dodge	Neon	$ 1,960.77	1.82%	12.71%
Saturn	Ion	$ 1,905.73	1.67%	12.70%
Buick	Park Avenue	$ 4,847.11	1.74%	12.63%
Audi	S4	$ 7,029.06	2.17%	12.47%
Scion	tC	$ 2,066.02	1.76%	12.19%
Saab	9-5	$ 4,310.67	1.74%	12.16%
Jaguar	XJ	$ 9,068.07	2.01%	11.69%
Chrysler	Crossfire	$ 3,362.52	1.94%	10.77%
Scion	xB	$ 1,589.51	1.76%	10.62%
BMW	X5	$ 7,114.54	1.81%	10.48%
Chevrolet	Tracker	$ 1,794.65	1.69%	9.67%
Jeep	Wrangler	$ 2,175.47	1.74%	8.57%
Aston Martin	Aston Martin	$ 17,100.17	3.62%	7.09%
Porsche	Carrera GT	$ 29,138.08	3.46%	6.31%
	Industry Average	**$ 9,231.27**	**2.10%**	**23.60%**

Why do some vehicles have higher accident repair costs than others? In the case of hybrids, the complexity of the ’05 (and previous) versions add significantly to the cost. One example, the Prius in a significant accident needs nearly three times more time and two times more parts costing nearly 9 times more than the comparable small car in the identical accident.

Clearly this will change over time. But the complexity of any vehicle plays significantly into the eventual cost of repair and replacement due to accident. This has always been the case and there is nothing in the technological advancements found in the repair industry to indicate it will change in the future.

The issue rests with manufacturers. If Toyota can reduce the complexity of building hybrids to a simple “plug and play” system whereby major hybrid electrics and electronics can be easily detached and disposed of for simplified replacement, the cost would drop dramatically. That is not the case with most hybrids today, however.

The same can be said for same-segment models. Manufacturing and pre-production engineering can make the difference in time needed and energy expended to fix what an accident has wrought. Many automakers now work with insurance industry specialists to find those areas that can be simplified.

Full-size vans are an example. When Ford restyled its Econoline van some years ago, it had two distinctly different grille-headlight configurations. One was for general consumers, the other for commercial models. One used stylish headlights, the other more conventional flat headlights.

The difference was to ease and lower the cost of repair. Commercial vehicles are in a high-damage work environment and headlights and taillights are often broken. To replace the consumer version costs in excess of $250 while the commercial version was less than $50.

Note any Chevrolet full-size van with high taillights located above the “damage line” putting it out harms way. The panel below the lights is a simple plastic piece that is easily replaced if broken and far less costly to repair than a light lens and related hardware.

Chevrolet also has a w/t (for work truck) version of its popular Silverado. This, too, has simplified work-environment components such as an unpainted grille and flat headlight lenses.

Toyota's Tundra pickup faced a similar issue for many commercial fleets. While the fuel economy was somewhat better than domestic pickups and the reliability was theoretically the same or better, with resale value higher, fleets were asked to select the Toyota over the more popular Ford F series.

The only issue, however, was in repair. The complex Tundra taillight would cost more than $125 to repair while the F Series taillight was about half that amount.

In addition, the general maintenance costs for the Tundra were as much as 20 percent higher simply because Toyota parts cost more than similar replacement and maintenance Ford parts.

All of this plays into the overall social energy costs because, again, more complexity means more energy needed to design, develop, manufacture and replace components.

CHAPTER SIX – Design and Development

Designing and developing new vehicles and/or updating old ones are among the most energy expensive parts of the new-vehicle production process. It requires years of intense engineering, design, parts development, evaluation, suitability, life-cycle vs. cost analysis, prototyping and vehicle integration. It is not unusual for a new vehicle to cost in excess of $1.5 billion just to move from concept to launch. And that doesn't guarantee success in a fickle consumer market.

One of the reasons glamorous show vehicles take as much as five years to eventually hit the streets is in this pre-production D&D stage. The Ford Thunderbird, as an example, was shown at major auto shows for three years before being ready for prime time in dealer showrooms. Not because Ford didn't want to build it or consumers weren't enthusiastically awaiting the product, rather converting from "one off" model to mass production is energy intense. Chevrolet is having a similar issue with the Camaro show car which, if built, will take at least two years till production.

As an aside, show vehicles can cost upwards of $3 million each, about 30 percent going to the energy-use component, 40 percent to labor and the rest in administration, authorization processes, design and engineering.

Much of this money for D&D may not result in a product or system that works or meets consumer demand levels originally anticipated. The General Motors Impact electric vehicle, as an example, lasted only a few short years – a smaller time frame than the original design and development stage.

For CNW's Dust to Dust study we had to include some specific technological design and development costs associated with a single product that could be leveraged against other products would not be. The technology gamble for these parts or components may or may not spawn additional products.

Another quick aside: One of the Detroit 3 had a team of engineers looking at how a whole vehicle and components could be recycled into future new vehicles.

Components for the auto industry are designed to a 200,000 mile or 20 year lifespan. (This is a generalization, but one that works for this explanation.) The aircraft industry designs to a higher standard – about a million miles and/or 50 years.

The auto company asked: “What if we could develop major and minor components to this longer-lifetime standard? Could the parts be “salvaged” and re-used in “new” passenger cars?

For example, if a window winder motor could be designed and built to a million-mile standard, what would the added cost be? The findings were dramatic. Quadrupling the life expectancy of a part costs about 20 percent more. If that part could be re-used through salvaging the window-winder motor and installing it in a new vehicle, a single re-use would cut the cost of that part by 30 percent (adjusting for refurbishing expenses, testing to assure a part is still good, etc.).

Do that with a third of new-vehicle components and the manufacturing cost of the entire vehicle could be slashed as much as 20 percent.

Standing in the way of implementing such a program is the higher cost of the original vehicle and the years it would take before longer-lifecycle components would be available for re-use.

The same is true with new technology such as hybrids or developing E85 or E100 power plants. The passenger car’s life-environment can be and is dramatically diverse. In the same region of the country, temperature changes can swing 100 degrees in any give year. A simple act of sliding across a fabric seat in a car once generated enough static electricity to fry electrical systems. Design and development of different seat fabrics and relocation of seat-based electrical systems ended that problem, but the D&D energy cost was significant.

All of the environmental changes that passenger vehicles contend with would kill even the best in-home or office computer and consumers have zero tolerance for a vehicle failing day-use while they will put up with hours on the phone discussing a crashed computer with a technicians or support person.

That said, D&D in more intense with automobiles than any other consumer product and thus demands significantly higher energy costs for lights, employee transportation, prototype development, environmental testing and the hundreds of other components in making the product suitable for daily use by an often negligent buyer in literally hundreds of often harsh environments.

For these and many other reasons, the D&D cost for a vehicle has risen by a factor of 25 since the middle 1960s, according to CNW data.

Add new technologies such as hybrid power and the need to meet the same end-use environmental demands as a non-hybrid (or full electric as the Impact was) it is no surprise that the D&D cost for a Prius is dramatically different than a comparably sized Toyota Corolla.

As the figures below show, the Prius cost about $29,000 per vehicle sold in D&D energy while the Corolla was $2,600.

As time passes and the design and development of the Prius's hybrid technology is leveraged to other vehicles, the cost obviously will diminish on a per-model, per-sale basis. We, however, could not make the assumption that any of that technology would be spread across other products at the time of this study. As the GM Impact showed, high-tech products aren't guaranteed a long life.

So we had to include all of the Prius's technology D&D energy consumption into a single product.

One of the questions asked by those who viewed early results of this study was this: "How can Toyota afford to sell a vehicle for less than it cost them to develop?"

Clearly the hybrid design was and remains a gamble. As sales have shown for some hybrids early in 2006, there are no guarantees consumers will continue to pay a premium for such technology if there isn't a compelling reason and many alternatives.

As can be seen in the sales data below, hybrid sales rose by nearly 50 percent in January vs. the previous year's January but fell each month thereafter. For the first four months of the year, hybrid sales have dropped 6.6 percent vs. the first four months of the previous year even though there are more hybrid models being offered.

		cy06 v 05 Mo v Mo Change	cy06 v 05 YTD v YTD Change	cy06 Mkt Share	cy05 Mkt Share
January	**Total Hybrid Vehicles**	**48.8%**	**48.8%**	**1.0%**	**0.7%**
February	**Total Hybrid Vehicles**	**-1.4%**	**21.1%**	**0.7%**	**0.7%**
March	**Total Hybrid Vehicles**	**-28.1%**	**-2.1%**	**0.7%**	**1.0%**
April	**Total Hybrid Vehicles**	**-17.0%**	**-6.6%**	**1.1%**	**1.2%**

As a share of market, hybrids have climbed from 0.7 percent to 1.2 percent, but much of that is on the back of new models. In April, for example, hybrid sales as a share of market slipped by a tenth of a point even though there are a couple of new models in the hybrid mix.

Looking at individual hybrid models, we see a very similar pattern.

	Apr-06	**Apr-05**	**% Chng**	**Shr Mo. 06**	**Shr Mo. 05**	**% Chng**
Escape Hybrid	*3,039*	*1,705*	78.2%	0.2%	0.1%	85.1%
Mariner Hybrid	*381*	-	#DIV/0!	0.0%	0.0%	#DIV/0!
Accord Hybrid	614	2,023	-69.6%	0.0%	0.1%	-68.5%
Civic Hybrid	3,087	3,466	-10.9%	0.2%	0.2%	-7.5%
Insight	110	90	22.2%	0.0%	0.0%	26.9%
Prius	8,234	11,345	-27.4%	0.6%	0.8%	-24.6%
Total Hybrid Vehicles	**15,465**	**18,629**	**-17.0%**	**1.1%**	**1.2%**	**-13.8%**
	YTD '06	**YTD '05**	**% Chng**	**Shr ytd 06**	**Shr ytd 05**	**% Chng**
Escape Hybrid	*6,514*	*5,274*	23.5%	0.1%	0.1%	23.8%
Mariner Hybrid	*735*	-	#DIV/0!	0.0%	0.0%	#DIV/0!
Accord Hybrid	2,329	5,545	-58.0%	0.0%	0.1%	-57.9%
Civic Hybrid	10,264	8,884	15.5%	0.2%	0.2%	15.8%
Insight	320	175	82.9%	0.0%	0.0%	83.4%
Prius	30,357	34,225	-11.3%	0.6%	0.6%	-11.1%
Total Hybrid Vehicles	**50,519**	**54,103**	**-6.6%**	**0.9%**	**1.0%**	**-6.4%**

While Toyota says the Prius hybrid sales were down because the manufacturing plant needed to make room for other hybrid models including Highlander and RX400h that clearly is not an excuse Honda can make. Accord Hybrid sales are off nearly 70 percent in April and 58 percent for the first four months of the year.

On the "up" side, note that Escape hybrid sales show an increase, but this comes at a time Ford is delivering these vehicles to taxi cab fleets in some major markets.

Back to the cost of design and development.

Within market segments, there can be significant differences in the social energy cost for individual models based on the aforementioned amount of technology and sophistication at the individual automaker’s facilities.

Generally, as a share of overall Dust to Dust Social Energy Consumption, most vehicles have a fairly consistent level of 2 to 3 percent. But the amount of total energy needed by model can be significantly different.

Just in the Budget Car category, for example, the Design and Development energy cost ranges from a low of $2,325.01 for the Chevrolet Aveo to a high of $3,563.89 for the Kia Rio.

In the Entry Level Sport Utility Category, the extremely simple, technologically archaic Wrangler requires barely $2,300 for Design/Development energy while the Isuzu Trooper – from a smaller manufacturer with little leveraging power and a more technologically advanced vehicle than the Wrangler – costs more than $8,900 in energy to design and develop.

Among Large SUVs, Nissan holds the low-cost leadership role in D&D energy consumption with the Armada while GM’s Suburban has the high ground at $19,400. That figure, by the way, is higher than it was in previous years because of the softening of the large SUV market. For Armada, much of its very basic design is shared by the Nissan full-size Titan pickup truck.

Dust to Dust Energy Report -- Automotive

Division	Model	Design/Development	D/D %
Kia	Rio	$3,563.89	2.28%
Hyundai	Accent	$2,656.53	2.06%
Chevrolet	Aveo	$2,325.01	2.14%
Toyota	Echo	$2,555.84	2.32%
	Total Budget Cars	**$2,775.32**	**2.20%**
Chevrolet	Cobalt	$3,571.60	2.09%
Toyota	Matrix **	$3,727.53	2.28%
Mazda	Mazda3	$3,563.84	2.22%
Nissan	Sentra	$3,621.98	2.30%
Suzuki	Aerio	$2,965.70	2.10%
Mitsubishi	Lancer	$2,906.29	2.16%
Kia	Spectra	$3,148.51	2.31%
Scion	tC	$2,651.79	2.26%
Suzuki	Forenza	$2,689.43	2.24%
Ford	Focus	$3,150.30	2.32%
Mazda	Protégé	$2,653.63	2.13%
Pontiac	Sunfire	$2,809.56	2.36%
Chevrolet	Cavalier	$2,545.37	2.21%
Scion	xA	$2,437.18	2.12%
Toyota	Corolla	$2,608.15	2.11%
Dodge	Neon	$2,441.27	2.27%
Hyundai	Elantra	$2,534.39	2.16%
Saturn	Ion	$2,579.02	2.26%
Ford	Escort	$2,297.38	2.11%
Scion	xB	$2,120.55	2.35%
	Total Economy Cars	**$2,851.17**	**2.22%**
Nissan	Xterra	$8,320.94	2.16%
Isuzu	Trooper	$8,393.18	2.10%
Mazda	Mazda5	$6,717.31	2.34%
Isuzu	Rodeo	$6,396.11	2.26%
Suzuki	XL-7	$5,293.20	2.17%
Suzuki	Grand Vitara	$5,675.51	2.35%
Kia	Sorento	$3,953.51	2.10%
Chevrolet	Blazer	$6,308.04	2.33%
Suzuki	Vitara	$4,462.08	2.25%
Isuzu	Rodeo Sport	$4,357.70	2.20%
Kia	Sportage	$4,150.51	2.23%
Jeep	Liberty	$4,626.85	2.23%
Chevrolet	Tracker	$2,293.76	2.16%
Jeep	Wrangler	$2,728.09	2.18%
	Ttl Entry Level SUVs	**$5,262.63**	**2.22%**

Dust to Dust Energy Report -- Automotive

Mitsubishi	Outlander	$9,567.78	2.31%
Hyundai	Tucson	$7,564.86	2.34%
Mazda	Tribute	$7,190.28	2.13%
Hyundai	Santa Fe	$6,393.51	2.10%
Pontiac	Torrent	$6,980.87	2.18%
Ford	Escape	$7,212.95	2.30%
Mercury	Mariner	$6,380.73	2.17%
Toyota	RAV4	$7,002.47	2.22%
Saturn	Vue	$6,462.94	2.17%
Chevrolet	Equinox	$7,177.16	2.09%
Honda	Element	$5,471.91	2.13%
Pontiac	Aztek	$6,076.56	2.35%
Honda	CR-V	$4,947.04	2.15%
	Ttl Entry Level Sportwagons	**$6,802.24**	**2.20%**
Nissan	Titan	$10,459.39	2.30%
Toyota	Tundra	$11,026.84	2.30%
Dodge	Ram pickup	$12,147.28	2.12%
Chevrolet	Silverado	$12,220.92	2.09%
GMC	Sierra	$12,528.04	2.20%
Ford	F Series	$13,981.04	2.18%
	Ttl Full Size Pickup	**$12,060.58**	**2.20%**
GMC	Savana/G Van	$16,633.66	2.27%
Ford	Econoline/Club Wagon	$14,312.58	2.07%
GMC	Express/G Van	$14,494.46	2.31%
Dodge	Sprinter Van	$21,530.57	2.34%
Dodge	Ram Van	$11,393.50	2.21%
Ford	Econoline van	$14,327.20	2.32%
	Full Size Van	**$15,448.66**	**2.25%**
Honda	Accord Hybrid	$24,207.51	6.28%
Toyota	Prius	$29,889.18	8.44%
Honda	Civic Hybrid	$26,451.48	7.23%
Ford	Escape Hybrid	$23,932.68	5.34%
Mercury	Mariner Hybrid	$23,868.35	5.47%
Honda	Insight	$31,776.06	9.92%
Lexus	RX 400h	$47,128.50	6.21%
Toyota	Highlander Hybrid	$21,010.25	5.47%
	Ttl Hybrids	**$28,533.00**	**6.80%**
Volkswagen	Phaeton	$61,232.60	2.27%
Audi	allroad quattro	$26,413.71	2.34%
Audi	A6	$20,534.10	2.19%
Lexus	LS 430	$21,903.34	2.08%
Lexus	GS 430	$17,552.42	2.20%
Infiniti	Q45	$19,700.42	2.31%
Jaguar	S-Type	$15,166.17	2.30%
Infiniti	M45	$11,042.27	2.26%

Lexus	GS 300	$11,735.28	2.32%
Cadillac	DTS	$14,027.66	2.13%
Cadillac	DeVille	$14,636.10	2.13%
M-Benz	E class	$18,181.29	2.14%
Cadillac	Seville	$11,127.21	2.08%
Volvo	80 series	$15,221.94	2.28%
Cadillac	STS	$15,952.17	2.33%
BMW	5 Series	$13,810.97	2.13%
Acura	RL	$10,160.21	2.24%
Lincoln	Town Car	$13,654.56	2.26%
BMW	M3	$9,152.19	2.35%
	Total Luxury Car	**$17,958.14**	**2.23%**
Volkswagen	Golf	$9,289.30	2.28%
Volkswagen	Golf GTI	$8,751.65	2.20%
Saturn	L series	$9,532.52	2.29%
Honda	Civic	$9,205.94	2.14%
Chevrolet	HHR	$9,142.95	2.26%
Pontiac	G6	$8,229.95	2.21%
Chevrolet	Classic	$11,062.18	2.13%
Subaru	Impreza	$6,835.85	2.24%
Pontiac	Grand Am	$9,744.59	2.28%
Ford	Fusion	$9,340.22	2.21%
Mercury	Milan	$9,106.88	2.19%
Dodge	Stratus	$9,329.56	2.14%
Kia	Optima	$7,482.74	2.33%
Hyundai	Sonata	$6,620.02	2.06%
Suzuki	Verona	$6,802.72	2.35%
Volkswagen	Beetle	$7,279.94	2.33%
Pontiac	Vibe	$3,548.20	2.18%
Chevrolet	Malibu	$7,053.55	2.26%
Chrysler	PT Cruiser	$6,505.64	2.10%
Chrysler	Sebring	$4,920.73	2.34%
	Ttl Lower Mid-Range Cars	**$7,989.26**	**2.23%**
Nissan	Pathfinder	$7,510.23	2.14%
Toyota	4Runner	$9,079.55	2.35%
Mitsubishi	Montero	$7,415.78	2.17%
Mitsubishi	Montero Sport	$6,518.28	2.16%
Isuzu	Axiom	$5,809.15	2.36%
Land Rover	Freelander	$6,263.39	2.37%
Isuzu	Ascender	$5,454.76	2.21%
Jeep	Commander	$7,007.80	2.20%
Jeep	Grand Cherokee	$7,232.83	2.32%
Jeep	Grand Cherokee SRT-8	$6,591.06	2.13%
Dodge	Durango	$6,095.91	2.32%
Ford	Explorer	$6,074.72	2.13%
Chevrolet	TrailBlazer	$5,386.04	2.11%
	Ttl Lower Mid-Range SUV	**$6,649.19**	**2.23%**

Toyota	Sequoia	$14,511.20	2.26%
Nissan	Armada	$12,216.58	2.19%
Ford	Excursion	$18,326.23	2.06%
Chevrolet	Suburban	$19,271.48	2.26%
GMC	Yukon XL	$19,463.22	2.29%
Ford	Expedition	$18,022.37	2.08%
Chevrolet	Tahoe	$17,788.98	2.26%
GMC	Yukon	$17,271.31	2.22%
	Total Large SUV	**$17,108.92**	**2.20%**
Chrysler	Pacifica	$10,505.30	2.07%
Nissan	Murano	$10,315.07	2.31%
Toyota	Highlander	$9,072.55	2.34%
Ford	Freestyle/Windstar	$12,052.71	2.36%
Buick	Rendezvous	$8,359.23	2.08%
Honda	Pilot	$7,770.83	2.27%
Mitsubishi	Endeavor	$7,064.19	2.34%
	Total Mid-Range Sportwagons	**$9,305.70**	**2.25%**
Volkswagen	EuroVan/T4	$8,538.73	2.34%
Honda	Odyssey	$9,296.28	2.14%
Pontiac	Montana SV6	$7,739.21	2.08%
Chrysler	Town & Country	$8,701.31	2.29%
Buick	Terraza	$8,982.21	2.27%
Dodge	Caravan/Grand Caravan	$7,725.50	2.16%
Toyota	Sienna	$7,488.57	2.17%
Chevrolet	Venture	$8,306.73	2.24%
Saturn	Relay	$7,603.18	2.19%
Pontiac	Montana	$7,489.51	2.11%
Nissan	Quest	$7,051.40	2.08%
Chevrolet	Uplander	$7,481.27	2.27%
Ford	Freestar	$7,813.62	2.35%
Mercury	Monterey	$7,055.42	2.15%
Kia	Sedona	$6,298.21	2.29%
Mazda	MPV	$6,384.59	2.10%
GMC	Safari	$7,839.50	2.25%
Chevrolet	Astro	$7,601.25	2.15%
	Total Minivans	**$7,744.25**	**2.20%**
Volvo	70 series	$10,525.24	2.29%
Volvo	60 series	$7,780.15	2.13%
Mercury	Zephyr	$8,596.11	2.19%
Acura	TL	$7,813.19	2.15%
Acura	CL	$7,734.79	2.10%
Lincoln	LS	$6,715.23	2.13%
Jaguar	X-Type	$6,905.30	2.14%
Lexus	ES 330	$6,813.63	2.14%
Lexus	IS 300	$6,354.12	2.14%
Infiniti	G35	$6,605.48	2.16%
M-Benz	C class	$6,590.51	2.27%

Cadillac	CTS	$6,310.39	2.35%
BMW	330	$6,540.27	2.30%
Buick	Park Avenue	$5,799.81	2.08%
BMW	325	$6,059.62	2.32%
Saab	9-5	$5,299.15	2.14%
	Total Near Luxury Cars	**$7,027.69**	**2.19%**
Audi	A8	$22,022.53	2.07%
M-Benz	S class	$20,231.99	2.20%
Maserati	Maserati	$11,114.17	2.25%
BMW	7 Series	$13,943.96	2.36%
Jaguar	XJ	$10,412.49	2.31%
	Total Premium Cars	**$15,545.03**	**2.24%**
Mercury	Montego	$8,044.20	2.34%
Buick	LaCrosse	$7,893.48	2.13%
Volkswagen	Passat	$8,707.12	2.21%
Dodge	Magnum	$7,726.26	2.09%
Ford	Five Hundred	$7,317.32	2.11%
Dodge	Charger	$7,920.09	2.33%
Nissan	Maxima	$7,993.24	2.11%
Chrysler	300/300M	$8,522.44	2.26%
Mitsubishi	Diamante	$6,919.89	2.37%
Volvo	40 series	$6,593.78	2.15%
Infiniti	I30/I35	$7,359.02	2.12%
Mazda	Millenia	$5,080.13	2.07%
Audi	A4/S4	$6,412.66	2.14%
Audi	S4		2.20%
Acura	TSX	$6,667.59	2.29%
Saab	9-3	$6,276.68	2.11%
Saab	9-2	$5,901.84	2.22%
Buick	Regal	$3,893.73	2.20%
	Total Premium Mid-Range Cars	**$6,623.86**	**2.19%**
M-Benz	SLK class	$13,781.91	2.18%
M-Benz	CLS class	$19,088.43	2.20%
M-Benz	CLK class	$14,138.56	2.12%
Porsche	Boxster	$11,569.87	2.29%
Chevrolet	Corvette	$10,616.14	2.08%
Audi	TT	$9,129.41	2.34%
BMW	Z8	$10,066.93	2.08%
BMW	Z4	$8,679.68	2.38%
Ford	Thunderbird	$5,421.64	2.15%
Chrysler	Crossfire	$4,118.22	2.38%
	Total Premium Sporty Cars	**$10,661.08**	**2.22%**
Porsche	Cayenne	$17,867.97	2.23%
Volkswagen	Touareg	$17,546.74	2.28%
Land Rover	Range Rover	$18,105.64	2.33%
M-Benz	G class	$18,590.84	2.11%

Hummer	H1	$28,241.24	2.13%
Lexus	LX 470	$15,234.66	2.22%
Cadillac	Escalade ESV	$17,002.61	2.27%
Toyota	Land Cruiser	$22,569.42	2.36%
Hummer	H2	$12,377.98	2.08%
Cadillac	Escalade	$14,940.86	2.27%
Lincoln	Navigator	$12,102.47	2.30%
	Total Premium SUV	**$17,689.13**	**2.23%**
Volvo	XC90	$16,010.63	2.10%
Lexus	RX330	$14,460.30	2.28%
Infiniti	FX35	$11,864.95	2.26%
Infiniti	FX45	$12,193.15	2.11%
M-Benz	R class	$10,292.52	2.12%
Volvo	50 series	$9,484.25	2.07%
Acura	MDX	$12,027.49	2.17%
Cadillac	SRX	$11,290.54	2.37%
M-Benz	M class	$11,011.97	2.06%
BMW	X5	$8,109.00	2.06%
BMW	X3	$8,829.57	2.34%
	Total Premium Sportwagons	**$11,415.85**	**2.18%**
Honda	Accord	$9,836.31	2.16%
Volkswagen	Jetta wagon	$6,032.96	2.17%
Volkswagen	Jetta	$5,665.35	2.13%
Toyota	Camry	$8,599.93	2.22%
Subaru	Baja	$6,258.59	2.09%
Subaru	Legacy	$6,074.79	2.11%
Subaru	Forester	$6,897.60	2.29%
Subaru	Outback	$6,375.36	2.26%
Mazda	Mazda6	$6,428.14	2.21%
Dodge	Intrepid	$7,425.85	2.35%
Chevrolet	Monte Carlo	$6,436.37	2.26%
Mitsubishi	Galant	$4,812.24	2.15%
Pontiac	Grand Prix	$5,494.56	2.33%
Buick	Century	$5,865.51	2.32%
Mercury	Sable	$6,158.44	2.12%
Ford	Taurus	$6,143.49	2.06%
Mazda	626	$5,596.02	2.34%
Nissan	Altima	$4,408.41	2.09%
Chevrolet	Impala	$5,347.94	2.27%
Hyundai	XG350	$4,172.73	2.15%
Kia	Amanti	$4,695.59	2.30%
	Total Small Rid-Range Cars	**$6,129.82**	**2.21%**
Chevrolet	SSR	$7,625.89	2.18%
Honda	Ridgeline	$6,919.08	2.35%
GMC	Canyon	$5,686.68	2.36%
GMC	Sonoma	$5,013.27	2.09%
Nissan	Frontier	$4,171.11	2.10%

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Toyota	Tacoma	$4,624.95	2.33%
Chevrolet	Colorado	$4,342.06	2.10%
Mitsubishi	Raider	$4,281.34	2.18%
Mazda	B-Series	$4,347.56	2.07%
Dodge	Dakota	$4,063.14	2.33%
Ford	Ranger	$4,107.49	2.26%
Chevrolet	S10	$2,897.68	2.16%
	Total Small Pickup	**$4,840.02**	**2.21%**
Cadillac	Escalade EXT	$10,477.08	2.32%
Chevrolet	Avalanche	$10,425.47	2.25%
Lincoln	Mark LT	$8,049.04	2.16%
	Total Specialty Utility Pickup	**$9,650.53**	**2.24%**
Mazda	RX8	$7,676.98	2.23%
Nissan	350Z	$7,398.60	2.16%
Audi	A3	$6,302.35	2.16%
Mitsubishi	Eclipse Spyder	$5,138.55	2.08%
Mitsubishi	Eclipse	$6,858.08	2.36%
Pontiac	GTO	$6,342.55	2.18%
Toyota	Celica	$6,123.87	2.24%
Mini	Mini Cooper S	$7,251.59	2.36%
Acura	RSX	$7,185.77	2.37%
Pontiac	Solstice	$6,115.93	2.13%
Mini	Mini Cooper	$6,647.62	2.19%
Ford	Mustang	$6,831.69	2.15%
Toyota	MR2 Spyder	$5,838.86	2.14%
Mazda	MX-5 Miata	$5,802.63	2.17%
Honda	S2000	$5,387.93	2.29%
Hyundai	Tiburon	$6,546.63	2.37%
Pontiac	Firebird	$5,003.05	2.25%
Chevrolet	Camaro	$5,159.13	2.24%
	Total Touring	**$6,311.77**	**2.23%**
Toyota	Avalon	$8,956.63	2.27%
Buick	Lucerne	$6,630.78	2.08%
Pontiac	Bonneville	$6,946.24	2.13%
Chrysler	Concorde	$6,498.15	2.32%
Mercury	Grand Marquis	$6,964.55	2.37%
Ford	Crown Victoria	$6,977.65	2.32%
Buick	LeSabre	$5,589.70	2.23%
	Total Traditional Car	**$6,937.67**	**2.25%**
Maybach	Maybach	$69,623.26	2.34%
Rolls-Royce	Rolls-Royce	$61,987.58	2.13%
Bentley	Bentley	$62,416.00	2.18%
Porsche	Carrera GT	$19,040.81	2.26%
Lamborghini	Lamborghini	$10,108.15	2.08%
Ferrar	Ferrari	$11,211.55	2.38%
Ford	GT	$9,353.63	2.09%

Aston Martin	Aston Martin	$10,671.08	2.26%
	Total Ultra Luxury	**$31,801.51**	**2.22%**
Lexus	GX 470	$10,831.91	2.28%
Land Rover	Discovery	$11,794.14	2.30%
Land Rover	LR3	$12,616.76	2.28%
Infiniti	QX4	$7,989.78	2.13%
Land Rover	Range Rover Sport	$10,799.74	2.17%
Lincoln	Aviator	$9,965.28	2.22%
Mercury	Mountaineer	$9,346.19	2.34%
Subaru	B9 Tribeca	$7,775.20	2.36%
GMC	Envoy	$9,247.17	2.09%
Buick	Rainier	$8,099.05	2.11%
Saab	9-7X	$6,751.84	2.18%
Hummer	H3	$8,498.38	2.11%
	Total Upper Mid-Range SUV	**$9,476.29**	**2.21%**
Acura	NSX	$17,952.64	2.10%
M-Benz	SC 430	$11,765.12	2.09%
Cadillac	XLR	$11,745.33	2.19%
Jaguar	XK	$11,976.30	2.08%
Porsche	911 Carrera 4	$9,120.08	2.13%
Porsche	911 Carrera	$9,796.95	2.18%
M-Benz	SL Coupe/Roadster	$10,018.15	2.21%
M-Benz	CL class	$10,603.23	2.23%
BMW	6 Series	$8,428.22	2.15%
Lotus	Lotus	$5,900.37	2.15%
Dodge	Viper	$5,528.73	2.15%
	Total Upper Premium Sportscars	**$10,257.74**	**2.15%**
	Industry Straight Average	**$10,725.14**	**2.51%**

CHAPTER 7 -- Manufacturing

Anywhere from 20 to 50 percent of a vehicle's transaction price goes toward manufacturing that vehicle. A shift of barely a percentage point, however, can mean significantly higher wholesale profits, thus the reason large pickups and SUVs were so lucrative for automakers.

The research looked at plant efficiency, energy use and the energy that has been transferred from the automaker to suppliers. As mentioned, Toyota has claimed a 30 percent reduction of energy requirements to build vehicles in Japan. **Missing from that percentage is the off-loading of nearly all and in some cases more energy requirements to suppliers who are building full-module components to be placed into the assembly process.**

We also looked at the energy requirements for plant employees. For example, at one of the largest Japanese plants, virtually all workers use mass transit to reach their work place. The same manufacturer in the U.S. Southeast has workers who all drive personal vehicles to the plant, typically using cars and trucks with moderate to low fuel economy. The differences can be significant. The domestically built Honda Accord has an employee energy use of approximately $1.92 per day while the energy requirement to get a worker to the Japanese Accord plant is less than 18 cents per day.

This particular cost is not included in the retail price of the vehicles because the cost is borne by the worker from his or her paycheck. But the energy cost is a social one.

The direct cost to manufacture each of the models listed is between 35 and 40 percent of the dollar figure. For example, the Chevrolet Aveo manufacturing cost that Chevrolet or General Motors has to bear is $1,312 per vehicle. The total manufacturing cost is $3,116 including worker transportation patterns, infrastructure support (such as roads), fuel for worker vehicles and scores of other energy consuming components.

Again, as we've seen with other aspects of this study, the first buyer and the automaker do not have to pay for much of the social energy expenditure. This is passed on to workers, suppliers and their workers, society in general (mass transit, for example) and other third parties.

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Division	Model	Manufacturing Veh Cost Share Tran Prc	Manufacturing Share Tran Prc
Kia	Rio	$3,928	30.34%
Hyundai	Accent	$3,473	27.42%
Chevrolet	Aveo	$3,116	24.68%
Toyota	Echo	$2,864	25.53%
	Total Budget Cars	**$3,345**	**26.99%**
Chevrolet	Cobalt	$4,128	24.58%
Toyota	Matrix **	$4,121	23.66%
Mazda	Mazda3	$3,992	24.38%
Nissan	Sentra	$3,921	24.55%
Suzuki	Aerio	$3,619	23.95%
Mitsubishi	Lancer	$3,555	21.23%
Kia	Spectra	$3,521	22.51%
Scion	tC	$3,441	20.31%
Suzuki	Forenza	$3,421	21.22%
Ford	Focus	$3,271	19.98%
Mazda	Protégé	$3,147	21.51%
Pontiac	Sunfire	$3,087	19.38%
Chevrolet	Cavalier	$3,086	19.68%
Scion	xA	$2,997	22.79%
Toyota	Corolla	$2,983	18.79%
Dodge	Neon	$2,966	19.23%
Hyundai	Elantra	$2,947	19.22%
Saturn	Ion	$2,888	19.25%
Ford	Escort	$2,315	15.94%
Scion	xB	$1,947	13.01%
	Total Economy Cars	**$3,268**	**20.76%**
Nissan	Xterra	$8,237	33.58%
Isuzu	Trooper	$7,777	29.32%
Mazda	Mazda5	$6,843	36.51%
Isuzu	Rodeo	$6,281	32.25%
Suzuki	XL-7	$6,018	23.81%
Suzuki	Grand Vitara	$5,762	24.37%
Kia	Sorento	$5,377	22.01%
Chevrolet	Blazer	$5,278	26.04%
Suzuki	Vitara	$5,121	27.04%
Isuzu	Rodeo Sport	$4,991	25.52%
Kia	Sportage	$4,761	22.55%
Jeep	Liberty	$4,479	17.17%
Chevrolet	Tracker	$2,828	15.23%
Jeep	Wrangler	$2,461	9.70%
	Ttl Entry Level SUVs	**$5,444**	**24.65%**

Mitsubishi	Outlander	$9,234	40.74%
Hyundai	Tucson	$9,026	40.25%
Mazda	Tribute	$9,011	38.91%
Hyundai	Santa Fe	$8,227	33.07%
Pontiac	Torrent	$8,043	34.93%
Ford	Escape	$7,947	33.64%
Mercury	Mariner	$7,938	33.16%
Toyota	RAV4	$7,937	33.56%
Saturn	Vue	$7,527	33.89%
Chevrolet	Equinox	$7,421	30.57%
Honda	Element	$7,361	37.28%
Pontiac	Aztek	$6,282	28.29%
Honda	CR-V	$6,021	24.56%
	Ttl Entry Level Sportwagons	**$7,844**	**34.07%**
Nissan	Titan	$10,964	34.89%
Toyota	Tundra	$10,223	33.34%
Dodge	Ram pickup	$10,121	26.21%
Chevrolet	Silverado	$9,983	30.49%
GMC	Sierra	$9,983	28.34%
Ford	F Series	$9,746	25.90%
	Ttl Full Size Pickup	**$10,170**	**29.86%**
GMC	Savana/G Van	$10,967	41.59%
Ford	Econoline/Club Wagon	$10,946	36.44%
GMC	Express/G Van	$10,114	36.62%
Dodge	Sprinter Van	$9,861	28.47%
Dodge	Ram Van	$9,237	36.05%
Ford	Econoline van	$8,943	31.24%
	Full Size Van	**$10,011**	**35.07%**
Honda	Accord Hybrid	$13,424	44.43%
Toyota	Prius	$13,238	57.20%
Honda	Civic Hybrid	$13,192	55.83%
Ford	Escape Hybrid	$12,863	48.59%
Mercury	Mariner Hybrid	$12,849	45.52%
Honda	Insight	$11,974	59.18%
Lexus	RX 400h	$31,627	68.43%
Toyota	Highlander Hybrid	$20,244	55.58%
	Ttl Hybrids	**$16,176**	**54.35%**
Volkswagen	Phaeton	$45,686	45.95%
Audi	allroad quattro	$22,798	50.05%
Audi	A6	$20,223	39.35%
Lexus	LS 430	$19,287	34.61%
Lexus	GS 430	$17,993	35.74%
Infiniti	Q45	$17,288	30.42%
Jaguar	S-Type	$16,255	35.62%
Infiniti	M45	$15,793	34.60%

Lexus	GS 300	$15,733	35.43%
Cadillac	DTS	$14,143	30.39%
Cadillac	DeVille	$13,792	33.34%
M-Benz	E class	$13,497	21.82%
Cadillac	Seville	$13,468	32.66%
Volvo	80 series	$13,449	35.21%
Cadillac	STS	$12,937	27.63%
BMW	5 Series	$12,793	31.82%
Acura	RL	$11,254	21.91%
Lincoln	Town Car	$11,231	24.80%
BMW	M3	$11,111	23.69%
	Total Luxury Car	**$16,775**	**32.90%**
Volkswagen	Golf	$10,989	50.76%
Volkswagen	Golf GTI	$11,246	45.32%
Saturn	L series	$10,324	53.03%
Honda	Civic	$9,861	44.18%
Chevrolet	HHR	$17,442	97.37%
Pontiac	G6	$9,543	47.00%
Chevrolet	Classic	$9,245	47.09%
Subaru	Impreza	$9,064	38.38%
Pontiac	Grand Am	$9,062	41.29%
Ford	Fusion	$8,973	44.35%
Mercury	Milan	$8,973	41.63%
Dodge	Stratus	$8,821	45.41%
Kia	Optima	$8,124	46.27%
Hyundai	Sonata	$8,067	40.86%
Suzuki	Verona	$7,773	41.47%
Volkswagen	Beetle	$7,448	37.44%
Pontiac	Vibe	$4,121	22.33%
Chevrolet	Malibu	$7,819	34.84%
Chrysler	PT Cruiser	$6,568	28.39%
Chrysler	Sebring	$5,229	28.27%
	Ttl Lower Mid-Range Cars	**$8,935**	**43.78%**
Nissan	Pathfinder	$9,046	27.48%
Toyota	4Runner	$8,937	24.24%
Mitsubishi	Montero	$8,869	25.92%
Mitsubishi	Montero Sport	$8,651	29.41%
Isuzu	Axiom	$7,069	24.57%
Land Rover	Freelander	$6,821	26.88%
Isuzu	Ascender	$6,238	23.51%
Jeep	Commander	$6,237	16.96%
Jeep	Grand Cherokee	$6,091	15.22%
Jeep	Grand Cherokee SRT-8	$6,943	16.56%
Dodge	Durango	$5,821	18.41%
Ford	Explorer	$5,719	18.20%
Chevrolet	TrailBlazer	$5,554	20.40%
	Ttl Lower Mid-Range SUV	**$7,077**	**22.13%**

Toyota	Sequoia	$14,963	35.70%
Nissan	Armada	$14,056	35.37%
Ford	Excursion	$13,462	27.85%
Chevrolet	Suburban	$12,768	31.08%
GMC	Yukon XL	$12,762	25.59%
Ford	Expedition	$12,461	27.98%
Chevrolet	Tahoe	$11,967	30.91%
GMC	Yukon	$11,962	28.42%
	Total Large SUV	**$13,050**	**30.36%**
Chrysler	Pacifica	$11,327	37.49%
Nissan	Murano	$10,226	33.83%
Toyota	Highlander	$10,144	34.42%
Ford	Freestyle/Windstar	$10,110	37.29%
Buick	Rendezvous	$9,747	35.27%
Honda	Pilot	$8,953	28.03%
Mitsubishi	Endeavor	$8,043	25.34%
	Total Mid-Range Sportwagons	**$9,793**	**33.09%**
Volkswagen	EuroVan/T4	$9,347	25.45%
Honda	Odyssey	$9,236	26.64%
Pontiac	Montana SV6	$9,124	35.49%
Chrysler	Town & Country	$9,038	26.26%
Buick	Terraza	$9,011	27.77%
Dodge	Caravan/Grand Caravan	$8,886	33.94%
Toyota	Sienna	$8,883	25.55%
Chevrolet	Venture	$8,734	35.92%
Saturn	Relay	$8,732	31.93%
Pontiac	Montana	$8,729	34.35%
Nissan	Quest	$8,629	27.42%
Chevrolet	Uplander	$8,627	26.62%
Ford	Freestar	$8,429	37.91%
Mercury	Monterey	$8,429	30.90%
Kia	Sedona	$8,124	32.67%
Mazda	MPV	$7,956	29.33%
GMC	Safari	$7,028	30.37%
Chevrolet	Astro	$7,027	28.37%
	Total Minivans	**$8,554**	**30.38%**
Volvo	70 series	$10,114	26.68%
Volvo	60 series	$9,244	25.99%
Mercury	Zephyr	$8,947	31.11%
Acura	TL	$8,647	25.32%
Acura	CL	$8,238	25.25%
Lincoln	LS	$8,219	23.01%
Jaguar	X-Type	$7,776	23.48%
Lexus	ES 330	$7,546	23.93%
Lexus	IS 300	$7,468	21.51%
Infiniti	G35	$7,241	22.11%
M-Benz	C class	$6,924	17.96%

Cadillac	CTS	$6,847	21.56%
BMW	330	$6,586	18.67%
Buick	Park Avenue	$6,341	16.52%
BMW	325	$6,237	16.91%
Saab	9-5	$6,231	17.58%
	Total Near Luxury Cars	**$7,663**	**22.35%**
Audi	A8	$20,227	22.54%
M-Benz	S class	$14,949	12.02%
Maserati	Maserati	$12,446	10.83%
BMW	7 Series	$11,962	11.14%
Jaguar	XJ	$11,347	14.63%
	Total Premium Cars	**$14,186**	**14.23%**
Mercury	Montego	$9,223	33.49%
Buick	LaCrosse	$9,147	32.76%
Volkswagen	Passat	$8,361	27.81%
Dodge	Magnum	$8,227	29.04%
Ford	Five Hundred	$8,223	35.46%
Dodge	Charger	$8,042	32.56%
Nissan	Maxima	$8,009	28.49%
Chrysler	300/300M	$7,992	26.00%
Mitsubishi	Diamante	$7,872	29.69%
Volvo	40 series	$7,728	30.41%
Infiniti	I30/I35	$7,541	25.27%
Mazda	Millenia	$7,342	26.58%
Audi	A4/S4	$7,228	19.81%
Audi	S4	$7,777	13.80%
Acura	TSX	$7,029	24.46%
Saab	9-3	$6,666	22.12%
Saab	9-2	$6,326	24.55%
Buick	Regal	$4,753	20.21%
	Total Premium Mid-Range Cars	**$7,638**	**26.81%**
M-Benz	SLK class	$16,223	36.14%
M-Benz	CLS class	$14,944	23.82%
M-Benz	CLK class	$14,227	26.62%
Porsche	Boxster	$13,135	24.96%
Chevrolet	Corvette	$12,868	21.36%
Audi	TT	$11,279	27.23%
BMW	Z8	$11,136	22.15%
BMW	Z4	$10,117	26.19%
Ford	Thunderbird	$6,017	16.59%
Chrysler	Crossfire	$5,391	17.27%
	Total Premium Sporty Cars	**$11,534**	**24.23%**
Porsche	Cayenne	$9,063	8.94%
Volkswagen	Touareg	$16,844	41.42%
Land Rover	Range Rover	$15,383	17.37%
M-Benz	G class	$15,119	16.38%

Hummer	H1	$14,281	10.46%
Lexus	LX 470	$13,157	19.88%
Cadillac	Escalade ESV	$13,025	18.51%
Toyota	Land Cruiser	$12,973	23.86%
Hummer	H2	$12,332	22.51%
Cadillac	Escalade	$11,216	19.10%
Lincoln	Navigator	$10,662	20.50%
	Total Premium SUV	**$13,096**	**19.90%**
Volvo	XC90	$13,546	29.27%
Lexus	RX330	$13,471	36.20%
Infiniti	FX35	$12,343	31.47%
Infiniti	FX45	$13,089	26.55%
M-Benz	R class	$12,062	23.48%
Volvo	50 series	$11,967	41.91%
Acura	MDX	$11,592	27.26%
Cadillac	SRX	$11,337	25.82%
M-Benz	M class	$10,111	22.11%
BMW	X5	$9,648	14.21%
BMW	X3	$9,226	27.77%
	Total Premium Sportwagons	**$11,672**	**27.82%**
Honda	Accord	$8,882	30.45%
Volkswagen	Jetta wagon	$8,337	38.38%
Volkswagen	Jetta	$8,214	34.90%
Toyota	Camry	$7,961	30.12%
Subaru	Baja	$7,779	32.66%
Subaru	Legacy	$7,534	25.61%
Subaru	Forester	$7,438	28.24%
Subaru	Outback	$7,236	23.25%
Mazda	Mazda6	$7,319	28.62%
Dodge	Intrepid	$7,221	36.80%
Chevrolet	Monte Carlo	$6,137	22.85%
Mitsubishi	Galant	$5,969	24.38%
Pontiac	Grand Prix	$5,968	22.49%
Buick	Century	$5,928	30.12%
Mercury	Sable	$5,897	29.68%
Ford	Taurus	$5,893	29.86%
Mazda	626	$5,691	28.40%
Nissan	Altima	$5,628	22.25%
Chevrolet	Impala	$5,529	21.76%
Hyundai	XG350	$5,237	22.65%
Kia	Amanti	$5,146	22.50%
	Total Small Rid-Range Cars	**$6,712**	**27.90%**
Chevrolet	SSR	$9,949	30.78%
Honda	Ridgeline	$7,363	24.42%
GMC	Canyon	$5,229	24.46%
GMC	Sonoma	$5,229	23.69%
Nissan	Frontier	$4,726	19.90%

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Toyota	Tacoma	$4,673	27.67%
Chevrolet	Colorado	$4,583	20.54%
Mitsubishi	Raider	$4,581	15.45%
Mazda	B-Series	$4,434	20.39%
Dodge	Dakota	$4,131	16.68%
Ford	Ranger	$3,946	20.40%
Chevrolet	S10	$3,175	17.36%
	Total Small Pickup	**$5,168**	**21.81%**
Cadillac	Escalade EXT	$8,344	14.66%
Chevrolet	Avalanche	$8,061	24.76%
Lincoln	Mark LT	$7,919	19.59%
	Total Specialty Utility Pickup	**$8,108**	**19.67%**
Mazda	RX8	$10,114	36.98%
Nissan	350Z	$8,934	24.66%
Audi	A3	$8,541	28.18%
Mitsubishi	Eclipse Spyder	$8,471	27.20%
Mitsubishi	Eclipse	$8,233	38.90%
Pontiac	GTO	$8,127	29.52%
Toyota	Celica	$8,021	37.08%
Mini	Mini Cooper S	$7,773	36.42%
Acura	RSX	$7,773	34.46%
Pontiac	Solstice	$7,661	35.85%
Mini	Mini Cooper	$7,315	33.72%
Ford	Mustang	$7,163	25.81%
Toyota	MR2 Spyder	$6,856	29.72%
Mazda	MX-5 Miata	$5,992	24.51%
Honda	S2000	$5,928	19.22%
Hyundai	Tiburon	$5,862	33.23%
Pontiac	Firebird	$5,244	21.12%
Chevrolet	Camaro	$5,238	20.43%
	Total Touring	**$7,403**	**29.84%**
Toyota	Avalon	$8,016	26.42%
Buick	Lucerne	$7,342	22.25%
Pontiac	Bonneville	$7,261	25.37%
Chrysler	Concorde	$6,239	23.47%
Mercury	Grand Marquis	$5,777	22.44%
Ford	Crown Victoria	$5,773	24.83%
Buick	LeSabre	$5,591	22.44%
	Total Traditional Car	**$6,571**	**23.89%**
Maybach	Maybach	$47,192	12.44%
Rolls-Royce	Rolls-Royce	$43,435	13.19%
Bentley	Bentley	$43,008	24.93%
Porsche	Carrera GT	$18,448	4.00%
Lamborghini	Lamborghini	$16,333	8.12%
Ferrar	Ferrari	$16,143	6.32%
Ford	GT	$15,690	11.47%

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Aston Martin	Aston Martin	$12,338	5.11%
	Total Ultra Luxury	**$26,573**	**10.70%**
Lexus	GX 470	$10,946	24.75%
Land Rover	Discovery	$10,288	23.20%
Land Rover	LR3	$10,143	21.41%
Infiniti	QX4	$10,117	23.69%
Land Rover	Range Rover Sport	$9,862	15.08%
Lincoln	Aviator	$9,563	24.59%
Mercury	Mountaineer	$9,517	29.59%
Subaru	B9 Tribeca	$9,128	28.37%
GMC	Envoy	$8,946	25.21%
Buick	Rainier	$8,882	29.02%
Saab	9-7X	$8,837	22.53%
Hummer	H3	$7,943	24.74%
	Total Upper Mid-Range SUV	**$9,514**	**24.35%**
Acura	NSX	$18,142	19.88%
M-Benz	SC 430	$13,881	21.69%
Cadillac	XLR	$13,349	17.51%
Jaguar	XK	$12,461	15.89%
Porsche	911 Carrera 4	$11,532	13.34%
Porsche	911 Carrera	$11,155	15.89%
M-Benz	SL Coupe/Roadster	$10,944	6.60%
M-Benz	CL class	$10,319	8.80%
BMW	6 Series	$9,237	13.40%
Lotus	Lotus	$9,237	18.97%
Dodge	Viper	$8,867	10.48%
	Total Upper Premium Sportscars	**$11,739**	**14.77%**
	Industry Straight Average	**$10,191**	**29.65%**

CHAPTER 8 – Administrative Support

Over and above the manufacturing and supplier employees, each auto company needs extensive staffs for administration, marketing, secretarial, managerial and executive employees. (In all, about 130 data points.)

As a share of a vehicle's price, the energy cost for each model is fairly consistent in the 0.18 to 0.22 percent range. The exception is currently the Hybrid segment where administrative and related energy costs are twice the industry average.

The reasons for the difference: New products and especially technologically advanced ones require closer monitoring, more customer-service staffing, increases in quality control technicians, more training for both internal (e.g. manufacturing) and external (e.g. dealership technicians) service industries.

Once again, older technology requires less of this type of support and financial cost related to energy consumption.

Country of manufacture also plays a significant roll in these social energy costs. For a worker in Germany, for example, a manufacturer needs to pay a higher wage to cover energy-related (and clearly other) cost of living than in the Southern U.S. where electricity is less expensive.

Interestingly, however, manufacturers in as competitive market as the U.S. must hold such expenses to a fairly consistent level as a share of total energy costs.

And workers compensate similarly. As a share of total family budget, energy requirements in Japan and much of Europe are higher so housing (among many other considerations) is smaller than in the U.S.

The dollar cost, however, can be dramatically different for different segments of vehicles. While only an average of $235.14 per vehicle in budget cars, it is nearly $1,265 dollars for premium-car segment vehicles. Part of this is a function of volume and having the ability to spread the cost of support administration over fewer or more units.

Even within the category, employee administration can vary significantly based on the ability of such staffs to function in multiple capacities for multiple car lines. Honda spends the least per unit in the entry-level Sportwagon category while Mitsubishi Outlander had a similar share of energy costs as a share of overall energy consumption but a per unit cost about 80 percent higher ($729 per unit vs. $408 per Honda unit).

The Mercedes-Benz Maybach holds high ground at $5,328 per unit of energy support for customers who pay literally hundreds of thousands of dollars for a vehicle and expect a great deal of service in return. Also, clearly, this is a very limited production and sales vehicle in the U.S. so the expense cannot be spread around multiple models.

Dust to Dust Energy Report -- Automotive

Division	Model	Employees Plant/Office	Employees Plant/Office
Kia	Rio	0.189%	$ 295.17
Hyundai	Accent	0.192%	$ 247.12
Chevrolet	Aveo	0.195%	$ 211.76
Toyota	Echo	0.169%	$ 186.50
	Total Budget Cars	**0.186%**	**$ 235.14**
Chevrolet	Cobalt	0.190%	$ 325.31
Toyota	Matrix **	0.173%	$ 283.46
Mazda	Mazda3	0.170%	$ 273.15
Nissan	Sentra	0.190%	$ 299.86
Suzuki	Aerio	0.201%	$ 283.86
Mitsubishi	Lancer	0.196%	$ 263.35
Kia	Spectra	0.198%	$ 270.34
Scion	tC	0.199%	$ 233.60
Suzuki	Forenza	0.184%	$ 220.92
Ford	Focus	0.193%	$ 261.85
Mazda	Protégé	0.198%	$ 246.21
Pontiac	Sunfire	0.182%	$ 216.49
Chevrolet	Cavalier	0.195%	$ 224.49
Scion	xA	0.188%	$ 215.72
Toyota	Corolla	0.170%	$ 210.33
Dodge	Neon	0.171%	$ 184.23
Hyundai	Elantra	0.176%	$ 206.22
Saturn	Ion	0.187%	$ 213.40
Ford	Escort	0.169%	$ 184.36
Scion	xB	0.166%	$ 149.92
	Total Economy Cars	**0.185%**	**$ 238.35**
Nissan	Xterra	0.179%	$ 691.16
Isuzu	Trooper	0.173%	$ 690.12
Mazda	Mazda5	0.170%	$ 488.22
Isuzu	Rodeo	0.193%	$ 547.43
Suzuki	XL-7	0.187%	$ 455.72
Suzuki	Grand Vitara	0.173%	$ 418.35
Kia	Sorento	0.181%	$ 341.57
Chevrolet	Blazer	0.200%	$ 541.46
Suzuki	Vitara	0.192%	$ 381.27
Isuzu	Rodeo Sport	0.172%	$ 341.31
Kia	Sportage	0.187%	$ 347.42
Jeep	Liberty	0.165%	$ 342.81
Chevrolet	Tracker	0.199%	$ 211.32
Jeep	Wrangler	0.198%	$ 247.55
	Ttl Entry Level SUVs	**0.184%**	**$ 431.84**

Mitsubishi	Outlander	0.176%	$ 729.92
Hyundai	Tucson	0.189%	$ 611.27
Mazda	Tribute	0.176%	$ 595.52
Hyundai	Santa Fe	0.170%	$ 518.31
Pontiac	Torrent	0.177%	$ 566.02
Ford	Escape	0.174%	$ 546.39
Mercury	Mariner	0.194%	$ 570.71
Toyota	RAV4	0.182%	$ 574.34
Saturn	Vue	0.181%	$ 538.33
Chevrolet	Equinox	0.198%	$ 681.57
Honda	Element	0.182%	$ 466.89
Pontiac	Aztek	0.171%	$ 442.92
Honda	CR-V	0.177%	$ 408.03
	Ttl Entry Level Sportwagons	**0.181%**	**$ 557.71**
Nissan	Titan	0.187%	$ 850.39
Toyota	Tundra	0.170%	$ 814.67
Dodge	Ram pickup	0.170%	$ 975.45
Chevrolet	Silverado	0.166%	$ 972.05
GMC	Sierra	0.182%	$ 1,034.53
Ford	F Series	0.166%	$ 1,064.12
	Ttl Full Size Pickup	**0.174%**	**$ 951.87**
GMC	Savana/G Van	0.180%	$ 1,317.81
Ford	Econoline/Club Wagon	0.173%	$ 1,199.07
GMC	Express/G Van	0.171%	$ 1,073.90
Dodge	Sprinter Van	0.180%	$ 1,659.74
Dodge	Ram Van	0.172%	$ 885.13
Ford	Econoline van	0.185%	$ 1,141.00
	Full Size Van	**0.177%**	**$ 1,212.77**
Honda	Accord Hybrid	0.231%	$ 892.21
Toyota	Prius	0.477%	$ 1,687.75
Honda	Civic Hybrid	0.345%	$ 1,263.23
Ford	Escape Hybrid	0.226%	$ 1,013.87
Mercury	Mariner Hybrid	0.229%	$ 1,001.12
Honda	Insight	0.194%	$ 621.43
Lexus	RX 400h	0.304%	$ 2,309.14
Toyota	Highlander Hybrid	0.195%	$ 748.07
	Ttl Hybrids	**0.275%**	**$ 1,192.10**
Volkswagen	Phaeton	0.186%	$ 5,026.15
Audi	allroad quattro	0.174%	$ 1,966.62
Audi	A6	0.181%	$ 1,697.89
Lexus	LS 430	0.174%	$ 1,836.71
Lexus	GS 430	0.191%	$ 1,526.65
Infiniti	Q45	0.186%	$ 1,586.27
Jaguar	S-Type	0.170%	$ 1,119.03
Infiniti	M45	0.182%	$ 888.85
Lexus	GS 300	0.190%	$ 961.08

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Cadillac	DTS	0.173%	$ 1,140.94
Cadillac	DeVille	0.184%	$ 1,264.34
M-Benz	E class	0.188%	$ 1,594.25
Cadillac	Seville	0.197%	$ 1,054.89
Volvo	80 series	0.172%	$ 1,146.81
Cadillac	STS	0.171%	$ 1,172.75
BMW	5 Series	0.183%	$ 1,189.37
Acura	RL	0.191%	$ 865.18
Lincoln	Town Car	0.194%	$ 1,171.08
BMW	M3	0.187%	$ 729.21
	Total Luxury Car	**0.183%**	**$ 1,470.43**
Volkswagen	Golf	0.176%	$ 716.75
Volkswagen	Golf GTI	0.196%	$ 779.69
Saturn	L series	0.177%	$ 735.51
Honda	Civic	0.181%	$ 779.73
Chevrolet	HHR	0.188%	$ 761.57
Pontiac	G6	0.179%	$ 666.59
Chevrolet	Classic	0.200%	$ 1,039.19
Subaru	Impreza	0.185%	$ 563.81
Pontiac	Grand Am	0.167%	$ 713.12
Ford	Fusion	0.190%	$ 803.37
Mercury	Milan	0.169%	$ 703.41
Dodge	Stratus	0.193%	$ 839.83
Kia	Optima	0.166%	$ 532.88
Hyundai	Sonata	0.180%	$ 577.33
Suzuki	Verona	0.198%	$ 574.14
Volkswagen	Beetle	0.181%	$ 565.77
Pontiac	Vibe	0.201%	$ 327.30
Chevrolet	Malibu	0.174%	$ 544.27
Chrysler	PT Cruiser	0.177%	$ 547.81
Chrysler	Sebring	0.192%	$ 404.10
	Ttl Lower Mid-Range Cars	**0.184%**	**$ 658.81**
Nissan	Pathfinder	0.180%	$ 631.41
Toyota	4Runner	0.201%	$ 775.93
Mitsubishi	Montero	0.166%	$ 567.29
Mitsubishi	Montero Sport	0.172%	$ 518.57
Isuzu	Axiom	0.181%	$ 445.91
Land Rover	Freelander	0.179%	$ 473.46
Isuzu	Ascender	0.189%	$ 465.86
Jeep	Commander	0.178%	$ 566.74
Jeep	Grand Cherokee	0.183%	$ 571.75
Jeep	Grand Cherokee SRT-8	0.176%	$ 543.85
Dodge	Durango	0.171%	$ 449.50
Ford	Explorer	0.169%	$ 481.53
Chevrolet	TrailBlazer	0.195%	$ 497.06
	Ttl Lower Mid-Range SUV	**0.180%**	**$ 537.60**
Toyota	Sequoia	0.183%	$ 1,176.06

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Nissan	Armada	0.167%	$ 933.29
Ford	Excursion	0.180%	$ 1,599.77
Chevrolet	Suburban	0.191%	$ 1,627.98
GMC	Yukon XL	0.196%	$ 1,663.67
Ford	Expedition	0.187%	$ 1,624.18
Chevrolet	Tahoe	0.183%	$ 1,440.44
GMC	Yukon	0.178%	$ 1,384.82
	Total Large SUV	**0.183%**	**$ 1,431.27**
Chrysler	Pacifica	0.169%	$ 859.76
Nissan	Murano	0.189%	$ 844.33
Toyota	Highlander	0.173%	$ 671.90
Ford	Freestyle/Windstar	0.200%	$ 1,022.28
Buick	Rendezvous	0.199%	$ 799.75
Honda	Pilot	0.183%	$ 627.29
Mitsubishi	Endeavor	0.178%	$ 537.59
	Total Mid-Range Sportwagons	**0.184%**	**$ 766.13**
Volkswagen	EuroVan/T4	0.178%	$ 649.25
Honda	Odyssey	0.184%	$ 800.80
Pontiac	Montana SV6	0.188%	$ 698.83
Chrysler	Town & Country	0.178%	$ 675.17
Buick	Terraza	0.170%	$ 672.97
Dodge	Caravan/Grand Caravan	0.178%	$ 636.64
Toyota	Sienna	0.168%	$ 578.69
Chevrolet	Venture	0.192%	$ 712.01
Saturn	Relay	0.171%	$ 593.67
Pontiac	Montana	0.196%	$ 697.03
Nissan	Quest	0.173%	$ 586.20
Chevrolet	Uplander	0.188%	$ 620.96
Ford	Freestar	0.193%	$ 642.81
Mercury	Monterey	0.167%	$ 549.30
Kia	Sedona	0.194%	$ 533.79
Mazda	MPV	0.200%	$ 609.22
GMC	Safari	0.189%	$ 658.52
Chevrolet	Astro	0.165%	$ 583.35
	Total Minivans	**0.182%**	**$ 638.85**
Volvo	70 series	0.177%	$ 812.81
Volvo	60 series	0.174%	$ 635.56
Mercury	Zephyr	0.198%	$ 778.25
Acura	TL	0.183%	$ 664.10
Acura	CL	0.175%	$ 643.95
Lincoln	LS	0.189%	$ 594.74
Jaguar	X-Type	0.168%	$ 541.84
Lexus	ES 330	0.166%	$ 528.78
Lexus	IS 300	0.180%	$ 534.46
Infiniti	G35	0.186%	$ 568.54
M-Benz	C class	0.189%	$ 549.21
Cadillac	CTS	0.180%	$ 483.97

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BMW	330	0.175%	$ 497.85
Buick	Park Avenue	0.185%	$ 515.35
BMW	325	0.177%	$ 463.31
Saab	9-5	0.189%	$ 468.23
	Total Near Luxury Cars	**0.181%**	**$ 580.06**
Audi	A8	0.174%	$ 1,848.49
M-Benz	S class	0.167%	$ 1,537.89
Maserati	Maserati	0.185%	$ 915.46
BMW	7 Series	0.198%	$ 1,168.39
Jaguar	XJ	0.187%	$ 843.65
	Total Premium Cars	**0.182%**	**$ 1,262.77**
Mercury	Montego	0.166%	$ 571.15
Buick	LaCrosse	0.173%	$ 640.81
Volkswagen	Passat	0.168%	$ 661.90
Dodge	Magnum	0.200%	$ 739.00
Ford	Five Hundred	0.179%	$ 621.35
Dodge	Charger	0.174%	$ 590.70
Nissan	Maxima	0.165%	$ 625.95
Chrysler	300/300M	0.194%	$ 730.60
Mitsubishi	Diamante	0.179%	$ 522.20
Volvo	40 series	0.182%	$ 559.21
Infiniti	I30/I35	0.170%	$ 591.50
Mazda	Millenia	0.186%	$ 455.82
Audi	A4/S4	0.169%	$ 506.66
Audi	S4	0.198%	$ 641.36
Acura	TSX	0.191%	$ 556.85
Saab	9-3	0.191%	$ 568.71
Saab	9-2	0.188%	$ 499.12
Buick	Regal	0.170%	$ 301.43
	Total Premium Mid-Range Cars	**0.180%**	**$ 576.91**
M-Benz	SLK class	0.198%	$ 1,253.48
M-Benz	CLS class	0.193%	$ 1,677.63
M-Benz	CLK class	0.191%	$ 1,273.80
Porsche	Boxster	0.186%	$ 941.38
Chevrolet	Corvette	0.186%	$ 951.62
Audi	TT	0.176%	$ 686.95
BMW	Z8	0.181%	$ 875.60
BMW	Z4	0.176%	$ 642.40
Ford	Thunderbird	0.173%	$ 436.86
Chrysler	Crossfire	0.182%	$ 315.45
	Total Premium Sporty Cars	**0.184%**	**$ 905.52**
Porsche	Cayenne	0.171%	$ 1,368.30
Volkswagen	Touareg	0.200%	$ 1,537.84
Land Rover	Range Rover	0.176%	$ 1,368.81
M-Benz	G class	0.184%	$ 1,618.12
Hummer	H1	0.189%	$ 2,510.63

Lexus	LX 470	0.177%	$ 1,217.40
Cadillac	Escalade ESV	0.195%	$ 1,458.65
Toyota	Land Cruiser	0.171%	$ 1,638.80
Hummer	H2	0.185%	$ 1,103.05
Cadillac	Escalade	0.179%	$ 1,177.64
Lincoln	Navigator	0.187%	$ 983.56
	Total Premium SUV	**0.183%**	**$ 1,452.98**
Volvo	XC90	0.182%	$ 1,385.61
Lexus	RX330	0.199%	$ 1,263.21
Infiniti	FX35	0.196%	$ 1,027.18
Infiniti	FX45	0.174%	$ 1,006.93
M-Benz	R class	0.180%	$ 873.89
Volvo	50 series	0.165%	$ 755.99
Acura	MDX	0.169%	$ 937.57
Cadillac	SRX	0.172%	$ 818.36
M-Benz	M class	0.165%	$ 880.32
BMW	X5	0.187%	$ 735.04
BMW	X3	0.179%	$ 676.87
	Total Premium Sportwagons	**0.179%**	**$ 941.91**
Honda	Accord	0.201%	$ 915.75
Volkswagen	Jetta wagon	0.167%	$ 464.72
Volkswagen	Jetta	0.173%	$ 460.36
Toyota	Camry	0.170%	$ 657.66
Subaru	Baja	0.165%	$ 494.57
Subaru	Legacy	0.179%	$ 516.33
Subaru	Forester	0.195%	$ 587.35
Subaru	Outback	0.181%	$ 510.37
Mazda	Mazda6	0.173%	$ 503.43
Dodge	Intrepid	0.199%	$ 627.76
Chevrolet	Monte Carlo	0.166%	$ 472.55
Mitsubishi	Galant	0.186%	$ 416.90
Pontiac	Grand Prix	0.188%	$ 443.34
Buick	Century	0.182%	$ 460.74
Mercury	Sable	0.184%	$ 535.26
Ford	Taurus	0.193%	$ 575.02
Mazda	626	0.165%	$ 394.09
Nissan	Altima	0.187%	$ 395.19
Chevrolet	Impala	0.168%	$ 396.67
Hyundai	XG350	0.193%	$ 374.58
Kia	Amanti	0.170%	$ 347.82
	Total Small Rid-Range Cars	**0.180%**	**$ 502.40**
Chevrolet	SSR	0.196%	$ 684.38
Honda	Ridgeline	0.196%	$ 577.33
GMC	Canyon	0.197%	$ 475.30
GMC	Sonoma	0.200%	$ 479.97
Nissan	Frontier	0.194%	$ 384.78
Toyota	Tacoma	0.177%	$ 351.19

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Chevrolet	Colorado	0.172%	$ 355.97
Mitsubishi	Raider	0.176%	$ 346.28
Mazda	B-Series	0.170%	$ 357.05
Dodge	Dakota	0.186%	$ 324.35
Ford	Ranger	0.186%	$ 338.65
Chevrolet	S10	0.170%	$ 227.85
	Total Small Pickup	**0.185%**	**$ 408.59**
Cadillac	Escalade EXT	0.194%	$ 877.99
Chevrolet	Avalanche	0.173%	$ 800.89
Lincoln	Mark LT	0.197%	$ 735.12
	Total Specialty Utility Pickup	**0.188%**	**$ 804.67**
Mazda	RX8	0.188%	$ 648.66
Nissan	350Z	0.183%	$ 625.96
Audi	A3	0.181%	$ 527.38
Mitsubishi	Eclipse Spyder	0.165%	$ 408.21
Mitsubishi	Eclipse	0.186%	$ 541.20
Pontiac	GTO	0.168%	$ 489.23
Toyota	Celica	0.178%	$ 487.06
Mini	Mini Cooper S	0.172%	$ 528.28
Acura	RSX	0.176%	$ 533.85
Pontiac	Solstice	0.199%	$ 572.47
Mini	Mini Cooper	0.171%	$ 518.82
Ford	Mustang	0.172%	$ 547.30
Toyota	MR2 Spyder	0.172%	$ 468.85
Mazda	MX-5 Miata	0.166%	$ 444.30
Honda	S2000	0.191%	$ 450.17
Hyundai	Tiburon	0.199%	$ 549.70
Pontiac	Firebird	0.189%	$ 420.82
Chevrolet	Camaro	0.195%	$ 448.72
	Total Touring	**0.181%**	**$ 511.72**
Toyota	Avalon	0.196%	$ 775.05
Buick	Lucerne	0.193%	$ 615.56
Pontiac	Bonneville	0.167%	$ 544.61
Chrysler	Concorde	0.180%	$ 504.38
Mercury	Grand Marquis	0.177%	$ 519.48
Ford	Crown Victoria	0.170%	$ 510.63
Buick	LeSabre	0.194%	$ 487.15
	Total Traditional Car	**0.182%**	**$ 565.27**
Maybach	Maybach	0.179%	$ 5,328.16
Rolls-Royce	Rolls-Royce	0.183%	$ 5,325.69
Bentley	Bentley	0.165%	$ 4,719.82
Porsche	Carrera GT	0.173%	$ 1,456.90
Lamborghini	Lamborghini	0.190%	$ 921.57
Ferrar	Ferrari	0.187%	$ 881.65
Ford	GT	0.181%	$ 808.50
Aston Martin	Aston Martin	0.190%	$ 897.52

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	Total Ultra Luxury	**0.181%**	**$ 2,542.48**
Lexus	GX 470	0.191%	$ 908.21
Land Rover	Discovery	0.184%	$ 943.12
Land Rover	LR3	0.192%	$ 1,061.07
Infiniti	QX4	0.171%	$ 641.13
Land Rover	Range Rover Sport	0.196%	$ 977.26
Lincoln	Aviator	0.174%	$ 780.01
Mercury	Mountaineer	0.178%	$ 710.95
Subaru	B9 Tribeca	0.182%	$ 599.36
GMC	Envoy	0.196%	$ 869.28
Buick	Rainier	0.175%	$ 671.40
Saab	9-7X	0.189%	$ 586.17
Hummer	H3	0.200%	$ 807.06
	Total Upper Mid-Range SUV	**0.186%**	**$ 796.25**
Acura	NSX	0.166%	$ 1,419.11
M-Benz	SC 430	0.188%	$ 1,056.78
Cadillac	XLR	0.167%	$ 897.29
Jaguar	XK	0.188%	$ 1,080.91
Porsche	911 Carrera 4	0.171%	$ 730.80
Porsche	911 Carrera	0.181%	$ 812.67
M-Benz	SL Coupe/Roadster	0.176%	$ 798.91
M-Benz	CL class	0.195%	$ 928.44
BMW	6 Series	0.200%	$ 784.39
Lotus	Lotus	0.200%	$ 548.62
Dodge	Viper	0.181%	$ 464.79
	Total Upper Premium Sportscars	**0.183%**	**$ 865.70**
	Industry Straight Average	**0.199%**	**$ 849.84**

CHAPTER 9 – Transportation to Retail

Transportation energy costs is a function of size, weight and if the vehicle needs special handing because it is for a particularly critical audience of potential buyers.

This includes everything from the cost of in-transport vehicle covers to the fuel needed for trucking to a dealership from the plant and/or port. Also included is transportation from plant to port and bunker fuel for trans-oceanic shipping.

The energy cost to produce and transport bunker oil is approximately 40 percent of diesel fuel, according to CNW calculation and adjusting for refinery efficiencies by country. **In most cases, however, the payment for this transportation expense is borne by the first-time buyer of the vehicle as a "destination fee" and costs automakers very little if anything in terms real outlay**.

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Segment	Division	Model	Transport to Retailers	Transport to Retailers
b	Kia	Rio	0.190%	$ 296.73
b	Hyundai	Accent	0.171%	$ 220.09
b	Chevrolet	Aveo	0.188%	$ 204.16
b	Toyota	Echo	0.179%	$ 197.54
		Total Budget Cars	**0.182%**	**$ 229.63**
e	Chevrolet	Cobalt	0.165%	$ 282.51
e	Toyota	Matrix **	0.180%	$ 294.93
e	Mazda	Mazda3	0.179%	$ 287.61
e	Nissan	Sentra	0.196%	$ 309.33
e	Suzuki	Aerio	0.190%	$ 268.33
e	Mitsubishi	Lancer	0.197%	$ 264.70
e	Kia	Spectra	0.199%	$ 271.71
e	Scion	tC	0.188%	$ 220.69
e	Suzuki	Forenza	0.190%	$ 228.12
e	Ford	Focus	0.184%	$ 249.64
e	Mazda	Protégé	0.200%	$ 248.70
e	Pontiac	Sunfire	0.171%	$ 203.40
e	Chevrolet	Cavalier	0.177%	$ 203.77
e	Scion	xA	0.175%	$ 200.80
e	Toyota	Corolla	0.181%	$ 223.94
e	Dodge	Neon	0.187%	$ 201.46
e	Hyundai	Elantra	0.191%	$ 223.80
e	Saturn	Ion	0.193%	$ 220.24
e	Ford	Escort	0.170%	$ 185.45
e	Scion	xB	0.181%	$ 163.47
		Total Economy Cars	**0.185%**	**$ 237.63**
elsuv	Nissan	Xterra	0.189%	$ 729.77
elsuv	Isuzu	Trooper	0.196%	$ 781.87
elsuv	Mazda	Mazda5	0.169%	$ 485.35
elsuv	Isuzu	Rodeo	0.180%	$ 510.55
elsuv	Suzuki	XL-7	0.175%	$ 426.48
elsuv	Suzuki	Grand Vitara	0.174%	$ 420.77
elsuv	Kia	Sorento	0.186%	$ 351.00
elsuv	Chevrolet	Blazer	0.183%	$ 495.44
elsuv	Suzuki	Vitara	0.182%	$ 361.41
elsuv	Isuzu	Rodeo Sport	0.173%	$ 343.30
elsuv	Kia	Sportage	0.168%	$ 312.12
elsuv	Jeep	Liberty	0.176%	$ 365.66
elsuv	Chevrolet	Tracker	0.197%	$ 209.20
elsuv	Jeep	Wrangler	0.194%	$ 242.55
		Ttl Entry Level SUVs	**0.182%**	**$ 431.11**
elsw	Mitsubishi	Outlander	0.165%	$ 684.30

Dust to Dust Energy Report -- Automotive

elsw	**Hyundai**	Tucson	0.189%	$	611.27
elsw	**Mazda**	Tribute	0.186%	$	629.36
elsw	**Hyundai**	Santa Fe	0.186%	$	567.09
elsw	**Pontiac**	Torrent	0.185%	$	591.60
elsw	**Ford**	Escape	0.191%	$	599.77
elsw	**Mercury**	Mariner	0.197%	$	579.53
elsw	**Toyota**	RAV4	0.193%	$	609.05
elsw	**Saturn**	Vue	0.195%	$	579.97
elsw	**Chevrolet**	Equinox	0.173%	$	595.52
elsw	**Honda**	Element	0.197%	$	505.38
elsw	**Pontiac**	Aztek	0.175%	$	453.28
elsw	**Honda**	CR-V	0.171%	$	394.20
		Ttl Entry Level Sportwagons	**0.185%**	**$**	**569.25**
fspu	**Nissan**	Titan	0.192%	$	873.13
fspu	**Toyota**	Tundra	0.196%	$	939.27
fspu	**Dodge**	Ram pickup	0.189%	$	1,084.48
fspu	**Chevrolet**	Silverado	0.190%	$	1,112.59
fspu	**GMC**	Sierra	0.181%	$	1,028.85
fspu	**Ford**	F Series	0.196%	$	1,256.43
		Ttl Full Size Pickup	**0.191%**	**$**	**1,049.12**
fsv	**GMC**	Savana/G Van	0.193%	$	1,412.98
fsv	**Ford**	Econoline/Club Wagon	0.169%	$	1,171.34
fsv	**GMC**	Express/G Van	0.185%	$	1,161.82
fsv	**Dodge**	Sprinter Van	0.172%	$	1,585.98
fsv	**Dodge**	Ram Van	0.189%	$	972.62
fsv	**Ford**	Econoline van	0.201%	$	1,239.68
		Full Size Van	**0.185%**	**$**	**1,257.40**
hy	**Honda**	Accord Hybrid	0.190%	$	732.39
hy	**Toyota**	Prius	0.184%	$	651.61
hy	**Honda**	Civic Hybrid	0.184%	$	673.18
hy	**Ford**	Escape Hybrid	0.171%	$	766.38
hy	**Mercury**	Mariner Hybrid	0.196%	$	855.25
hy	**Honda**	Insight	0.166%	$	531.74
hy	**Lexus**	RX 400h	0.201%	$	1,525.42
hy	**Toyota**	Highlander Hybrid	0.178%	$	683.70
		Ttl Hybrids	**0.184%**	**$**	**802.46**
l	**Volkswagen**	Phaeton	0.189%	$	5,107.22
l	**Audi**	allroad quattro	0.174%	$	1,966.62
l	**Audi**	A6	0.176%	$	1,650.98
l	**Lexus**	LS 430	0.181%	$	1,910.60
l	**Lexus**	GS 430	0.187%	$	1,494.67
l	**Infiniti**	Q45	0.195%	$	1,663.02
l	**Jaguar**	S-Type	0.198%	$	1,303.34
l	**Infiniti**	M45	0.197%	$	962.11
l	**Lexus**	GS 300	0.176%	$	890.26
l	**Cadillac**	DTS	0.188%	$	1,239.87

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l	**Cadillac**	DeVille	0.182%	$ 1,250.60
l	**M-Benz**	E class	0.182%	$ 1,543.37
l	**Cadillac**	Seville	0.169%	$ 904.96
l	**Volvo**	80 series	0.167%	$ 1,113.47
l	**Cadillac**	STS	0.195%	$ 1,337.35
l	**BMW**	5 Series	0.192%	$ 1,247.86
l	**Acura**	RL	0.186%	$ 842.53
l	**Lincoln**	Town Car	0.183%	$ 1,104.68
l	**BMW**	M3	0.194%	$ 756.51
		Total Luxury Car	**0.185%**	**$ 1,488.95**
lmr	**Volkswagen**	Golf	0.173%	$ 704.54
lmr	**Volkswagen**	Golf GTI	0.187%	$ 743.89
lmr	**Saturn**	L series	0.166%	$ 689.80
lmr	**Honda**	Civic	0.171%	$ 736.65
lmr	**Chevrolet**	HHR	0.181%	$ 733.22
lmr	**Pontiac**	G6	0.170%	$ 633.07
lmr	**Chevrolet**	Classic	0.187%	$ 971.64
lmr	**Subaru**	Impreza	0.186%	$ 566.86
lmr	**Pontiac**	Grand Am	0.181%	$ 772.91
lmr	**Ford**	Fusion	0.190%	$ 803.37
lmr	**Mercury**	Milan	0.169%	$ 703.41
lmr	**Dodge**	Stratus	0.194%	$ 844.19
lmr	**Kia**	Optima	0.186%	$ 597.08
lmr	**Hyundai**	Sonata	0.196%	$ 628.65
lmr	**Suzuki**	Verona	0.197%	$ 571.24
lmr	**Volkswagen**	Beetle	0.195%	$ 609.53
lmr	**Pontiac**	Vibe	0.183%	$ 297.99
lmr	**Chevrolet**	Malibu	0.199%	$ 622.46
lmr	**Chrysler**	PT Cruiser	0.199%	$ 615.90
lmr	**Chrysler**	Sebring	0.201%	$ 423.04
		Ttl Lower Mid-Range Cars	**0.186%**	**$ 663.47**
lmr suv	**Nissan**	Pathfinder	0.176%	$ 617.37
lmr suv	**Toyota**	4Runner	0.201%	$ 775.93
lmr suv	**Mitsubishi**	Montero	0.195%	$ 666.39
lmr suv	**Mitsubishi**	Montero Sport	0.177%	$ 533.64
lmr suv	**Isuzu**	Axiom	0.186%	$ 458.23
lmr suv	**Land Rover**	Freelander	0.165%	$ 436.43
lmr suv	**Isuzu**	Ascender	0.170%	$ 419.03
lmr suv	**Jeep**	Commander	0.167%	$ 531.71
lmr suv	**Jeep**	Grand Cherokee	0.180%	$ 562.38
lmr suv	**Jeep**	Grand Cherokee SRT-8	0.169%	$ 522.22
lmr suv	**Dodge**	Durango	0.189%	$ 496.82
lmr suv	**Ford**	Explorer	0.198%	$ 564.16
lmr suv	**Chevrolet**	TrailBlazer	0.189%	$ 481.76
		Ttl Lower Mid-Range SUV	**0.182%**	**$ 543.54**
lsuv	**Toyota**	Sequoia	0.174%	$ 1,118.22
lsuv	**Nissan**	Armada	0.172%	$ 961.23

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lsuv	**Ford**	Excursion	0.168%	$ 1,493.12
lsuv	**Chevrolet**	Suburban	0.175%	$ 1,491.60
lsuv	**GMC**	Yukon XL	0.189%	$ 1,604.25
lsuv	**Ford**	Expedition	0.176%	$ 1,528.64
lsuv	**Chevrolet**	Tahoe	0.169%	$ 1,330.24
lsuv	**GMC**	Yukon	0.198%	$ 1,540.41
		Total Large SUV	**0.178%**	**$ 1,383.46**
mrsw	**Chrysler**	Pacifica	0.188%	$ 956.42
mrsw	**Nissan**	Murano	0.166%	$ 741.58
mrsw	**Toyota**	Highlander	0.174%	$ 675.78
mrsw	**Ford**	Freestyle/Windstar	0.174%	$ 889.39
mrsw	**Buick**	Rendezvous	0.190%	$ 763.58
mrsw	**Honda**	Pilot	0.186%	$ 637.57
mrsw	**Mitsubishi**	Endeavor	0.169%	$ 510.41
		Total Mid-Range Sportwagons	**0.178%**	**$ 739.25**
mv	**Volkswagen**	EuroVan/T4	0.169%	$ 616.42
mv	**Honda**	Odyssey	0.165%	$ 718.11
mv	**Pontiac**	Montana SV6	0.169%	$ 628.21
mv	**Chrysler**	Town & Country	0.197%	$ 747.24
mv	**Buick**	Terraza	0.193%	$ 764.02
mv	**Dodge**	Caravan/Grand Caravan	0.185%	$ 661.67
mv	**Toyota**	Sienna	0.184%	$ 633.81
mv	**Chevrolet**	Venture	0.190%	$ 704.59
mv	**Saturn**	Relay	0.185%	$ 642.28
mv	**Pontiac**	Montana	0.189%	$ 672.14
mv	**Nissan**	Quest	0.166%	$ 562.49
mv	**Chevrolet**	Uplander	0.186%	$ 614.36
mv	**Ford**	Freestar	0.194%	$ 646.14
mv	**Mercury**	Monterey	0.174%	$ 572.33
mv	**Kia**	Sedona	0.193%	$ 531.04
mv	**Mazda**	MPV	0.167%	$ 508.70
mv	**GMC**	Safari	0.194%	$ 675.94
mv	**Chevrolet**	Astro	0.172%	$ 608.10
		Total Minivans	**0.182%**	**$ 639.31**
nl	**Volvo**	70 series	0.184%	$ 844.96
nl	**Volvo**	60 series	0.171%	$ 624.60
nl	**Mercury**	Zephyr	0.167%	$ 656.40
nl	**Acura**	TL	0.174%	$ 631.44
nl	**Acura**	CL	0.199%	$ 732.27
nl	**Lincoln**	LS	0.176%	$ 553.83
nl	**Jaguar**	X-Type	0.185%	$ 596.67
nl	**Lexus**	ES 330	0.189%	$ 602.05
nl	**Lexus**	IS 300	0.165%	$ 489.92
nl	**Infiniti**	G35	0.196%	$ 599.11
nl	**M-Benz**	C class	0.181%	$ 525.96
nl	**Cadillac**	CTS	0.189%	$ 508.16
nl	**BMW**	330	0.181%	$ 514.92

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nl	**Buick**	Park Avenue	0.193%	$	537.64
nl	**BMW**	325	0.183%	$	479.01
nl	**Saab**	9-5	0.172%	$	426.11
		Total Near Luxury Cars	**0.182%**	**$**	**582.69**
p	**Audi**	A8	0.165%	$	1,752.88
p	**M-Benz**	S class	0.172%	$	1,583.93
p	**Maserati**	Maserati	0.193%	$	955.05
p	**BMW**	7 Series	0.175%	$	1,032.67
p	**Jaguar**	XJ	0.167%	$	753.42
		Total Premium Cars	**0.174%**	**$**	**1,215.59**
pmr	**Mercury**	Montego	0.175%	$	602.11
pmr	**Buick**	LaCrosse	0.192%	$	711.19
pmr	**Volkswagen**	Passat	0.166%	$	654.02
pmr	**Dodge**	Magnum	0.181%	$	668.80
pmr	**Ford**	Five Hundred	0.200%	$	694.24
pmr	**Dodge**	Charger	0.194%	$	658.59
pmr	**Nissan**	Maxima	0.171%	$	648.72
pmr	**Chrysler**	300/300M	0.191%	$	719.30
pmr	**Mitsubishi**	Diamante	0.182%	$	530.95
pmr	**Volvo**	40 series	0.177%	$	543.85
pmr	**Infiniti**	I30/I35	0.175%	$	608.90
pmr	**Mazda**	Millenia	0.168%	$	411.70
pmr	**Audi**	A4/S4	0.165%	$	494.67
pmr	**Audi**	S4	0.194%	$	628.40
pmr	**Acura**	TSX	0.189%	$	551.02
pmr	**Saab**	9-3	0.197%	$	586.58
pmr	**Saab**	9-2	0.172%	$	456.64
pmr	**Buick**	Regal	0.177%	$	313.84
		Total Premium Mid-Range Cars	**0.181%**	**$**	**582.42**
ps	**M-Benz**	SLK class	0.194%	$	1,228.15
ps	**M-Benz**	CLS class	0.192%	$	1,668.93
ps	**M-Benz**	CLK class	0.181%	$	1,207.11
ps	**Porsche**	Boxster	0.188%	$	951.50
ps	**Chevrolet**	Corvette	0.195%	$	997.66
ps	**Audi**	TT	0.184%	$	718.17
ps	**BMW**	Z8	0.189%	$	914.30
ps	**BMW**	Z4	0.190%	$	693.50
ps	**Ford**	Thunderbird	0.177%	$	446.96
ps	**Chrysler**	Crossfire	0.181%	$	313.72
		Total Premium Sporty Cars	**0.187%**	**$**	**914.00**
psuv	**Porsche**	Cayenne	0.174%	$	1,392.31
psuv	**Volkswagen**	Touareg	0.200%	$	1,537.84
psuv	**Land Rover**	Range Rover	0.180%	$	1,399.92
psuv	**M-Benz**	G class	0.182%	$	1,600.54
psuv	**Hummer**	H1	0.197%	$	2,616.90
psuv	**Lexus**	LX 470	0.168%	$	1,155.50

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psuv	**Cadillac**	Escalade ESV	0.197%	$ 1,473.61
psuv	**Toyota**	Land Cruiser	0.166%	$ 1,590.88
psuv	**Hummer**	H2	0.186%	$ 1,109.01
psuv	**Cadillac**	Escalade	0.197%	$ 1,296.06
psuv	**Lincoln**	Navigator	0.174%	$ 915.18
		Total Premium SUV	**0.184%**	**$ 1,462.52**
psw	**Volvo**	XC90	0.180%	$ 1,370.38
psw	**Lexus**	RX330	0.185%	$ 1,174.34
psw	**Infiniti**	FX35	0.170%	$ 890.92
psw	**Infiniti**	FX45	0.189%	$ 1,093.74
psw	**M-Benz**	R class	0.183%	$ 888.46
psw	**Volvo**	50 series	0.199%	$ 911.77
psw	**Acura**	MDX	0.189%	$ 1,048.52
psw	**Cadillac**	SRX	0.165%	$ 785.06
psw	**M-Benz**	M class	0.190%	$ 1,013.70
psw	**BMW**	X5	0.184%	$ 723.25
psw	**BMW**	X3	0.171%	$ 646.62
		Total Premium Sportwagons	**0.182%**	**$ 958.80**
smr	**Honda**	Accord	0.168%	$ 765.40
smr	**Volkswagen**	Jetta wagon	0.199%	$ 553.76
smr	**Volkswagen**	Jetta	0.196%	$ 521.56
smr	**Toyota**	Camry	0.189%	$ 731.17
smr	**Subaru**	Baja	0.168%	$ 503.56
smr	**Subaru**	Legacy	0.196%	$ 565.36
smr	**Subaru**	Forester	0.195%	$ 587.35
smr	**Subaru**	Outback	0.177%	$ 499.09
smr	**Mazda**	Mazda6	0.174%	$ 506.34
smr	**Dodge**	Intrepid	0.166%	$ 523.66
smr	**Chevrolet**	Monte Carlo	0.198%	$ 563.65
smr	**Mitsubishi**	Galant	0.180%	$ 403.45
smr	**Pontiac**	Grand Prix	0.174%	$ 410.32
smr	**Buick**	Century	0.190%	$ 480.99
smr	**Mercury**	Sable	0.180%	$ 523.63
smr	**Ford**	Taurus	0.194%	$ 578.00
smr	**Mazda**	626	0.182%	$ 434.69
smr	**Nissan**	Altima	0.186%	$ 393.08
smr	**Chevrolet**	Impala	0.181%	$ 427.36
smr	**Hyundai**	XG350	0.189%	$ 366.81
smr	**Kia**	Amanti	0.197%	$ 403.06
		Total Small Rid-Range Cars	**0.185%**	**$ 511.54**
spu	**Chevrolet**	SSR	0.191%	$ 666.92
spu	**Honda**	Ridgeline	0.179%	$ 527.25
spu	**GMC**	Canyon	0.171%	$ 412.57
spu	**GMC**	Sonoma	0.201%	$ 482.37
spu	**Nissan**	Frontier	0.199%	$ 394.70
spu	**Toyota**	Tacoma	0.165%	$ 327.38
spu	**Chevrolet**	Colorado	0.194%	$ 401.51

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spu	**Mitsubishi**	Raider	0.177%	$	348.25
spu	**Mazda**	B-Series	0.192%	$	403.25
spu	**Dodge**	Dakota	0.195%	$	340.05
spu	**Ford**	Ranger	0.200%	$	364.14
spu	**Chevrolet**	S10	0.186%	$	249.29
		Total Small Pickup	**0.188%**	**$**	**409.81**
sup	**Cadillac**	Escalade EXT	0.176%	$	796.53
sup	**Chevrolet**	Avalanche	0.187%	$	865.70
sup	**Lincoln**	Mark LT	0.176%	$	656.76
		Total Specialty Utility Pickup	**0.180%**	**$**	**773.00**
t	**Mazda**	RX8	0.170%	$	586.56
t	**Nissan**	350Z	0.183%	$	625.96
t	**Audi**	A3	0.180%	$	524.47
t	**Mitsubishi**	Eclipse Spyder	0.178%	$	440.38
t	**Mitsubishi**	Eclipse	0.185%	$	538.29
t	**Pontiac**	GTO	0.169%	$	492.14
t	**Toyota**	Celica	0.181%	$	495.27
t	**Mini**	Mini Cooper S	0.191%	$	586.64
t	**Acura**	RSX	0.190%	$	576.32
t	**Pontiac**	Solstice	0.199%	$	572.47
t	**Mini**	Mini Cooper	0.186%	$	564.33
t	**Ford**	Mustang	0.181%	$	575.94
t	**Toyota**	MR2 Spyder	0.183%	$	498.84
t	**Mazda**	MX-5 Miata	0.168%	$	449.65
t	**Honda**	S2000	0.198%	$	466.67
t	**Hyundai**	Tiburon	0.182%	$	502.74
t	**Pontiac**	Firebird	0.191%	$	425.27
t	**Chevrolet**	Camaro	0.193%	$	444.12
		Total Touring	**0.184%**	**$**	**520.34**
tr	**Toyota**	Avalon	0.186%	$	735.51
tr	**Buick**	Lucerne	0.198%	$	631.50
tr	**Pontiac**	Bonneville	0.171%	$	557.66
tr	**Chrysler**	Concorde	0.192%	$	538.01
tr	**Mercury**	Grand Marquis	0.187%	$	548.83
tr	**Ford**	Crown Victoria	0.177%	$	531.66
tr	**Buick**	LeSabre	0.176%	$	441.95
		Total Traditional Car	**0.184%**	**$**	**569.30**
u	**Maybach**	Maybach	0.174%	$	5,179.33
u	**Rolls-Royce**	Rolls-Royce	0.190%	$	5,529.41
ul	**Bentley**	Bentley	0.169%	$	4,834.24
ul	**Porsche**	Carrera GT	0.201%	$	1,692.70
ul	**Lamborghini**	Lamborghini	0.193%	$	936.12
ul	**Ferrar**	Ferrari	0.186%	$	876.93
ul	**Ford**	GT	0.166%	$	741.50
ul	**Aston Martin**	Aston Martin	0.201%	$	949.48
		Total Ultra Luxury	**0.185%**	**$**	**2,592.46**

umr suv	**Lexus**	GX 470	0.175%	$	832.13
umr suv	**Land Rover**	Discovery	0.166%	$	850.86
umr suv	**Land Rover**	LR3	0.165%	$	911.86
umr suv	**Infiniti**	QX4	0.196%	$	734.86
umr suv	**Land Rover**	Range Rover Sport	0.177%	$	882.53
umr suv	**Lincoln**	Aviator	0.201%	$	901.04
umr suv	**Mercury**	Mountaineer	0.187%	$	746.90
umr suv	**Subaru**	B9 Tribeca	0.177%	$	582.89
umr suv	**GMC**	Envoy	0.193%	$	855.97
umr suv	**Buick**	Rainier	0.201%	$	771.16
umr suv	**Saab**	9-7X	0.188%	$	583.07
umr suv	**Hummer**	H3	0.181%	$	730.39
		Total Upper Mid-Range SUV	**0.184%**	**$**	**781.97**
ups	**Acura**	NSX	0.166%	$	1,419.11
ups	**M-Benz**	SC 430	0.168%	$	944.36
ups	**Cadillac**	XLR	0.174%	$	934.90
ups	**Jaguar**	XK	0.196%	$	1,126.91
ups	**Porsche**	911 Carrera 4	0.176%	$	752.17
ups	**Porsche**	911 Carrera	0.170%	$	763.28
ups	**M-Benz**	SL Coupe/Roadster	0.177%	$	803.45
ups	**M-Benz**	CL class	0.195%	$	928.44
ups	**BMW**	6 Series	0.187%	$	733.40
ups	**Lotus**	Lotus	0.169%	$	463.58
ups	**Dodge**	Viper	0.165%	$	423.71
		Total Upper Premium Sportscars	**0.177%**	**$**	**844.85**
		Industry Straight Average	**0.198%**	**$**	**843.93**

As with all of the Dust to Dust study, we looked long and hard at the support industries necessary to make transportation to retail efficient for the manufacturer. Off loading of trans-oceanic ships, port facility maintenance and infrastructure, intermediate vehicle holding yards including security issues, pre- and post-delivery “prep” for sale, etc.

CHAPTER 10 – Dealership Expenses

To support the sale of a single vehicle requires a dealership have a wide range of support services and facilities including, but not exclusively, showroom space, outside storage areas, service and parts facilities, lot lighting, always-on heating and cooling, washing and preparation facilities, used-car operations (required by franchises) and an assortment of other operations. Add to that the vast array of supplier industries such as office equipment, service equipment manufacturers, government/community infrastructure.

On a per-vehicle basis, the dealer and those support services spend more than 14 percent of a vehicle's transaction price in energy expenses or about $1,361 per unit sold. This includes energy required for sales, administration, service/parts and other employees needed to operate the business and paid for by those individuals from their pay.

Service is an additional matter because of the intensity of the energy requirements, especially with new technologies and electronic components in vehicles.

Training for service personnel, for example, is significantly higher for new products with unique or break-through technology with high learning curves. While much of this, presumably, will be lower on a per-unit sold basis over time, early versions of high-tech models and/or components require out-of-the-ordinary energy costs. The GM Impact electric required extensive technician training but, as it happened, virtually all of that eventually had to be leveraged against very few vehicles sold/leased.

The complexities of the retail environment require significant manufacturer support in regards to something as simple as field staffs who visit, measure effectiveness and recommend changes to dealers based on that auto company’s shifting desires and demands. Energy requirements for such field staff support can be dramatic, especially for automakers with far flung outlets rather than concentrated in urban/suburban areas.

An analysis of one simple dealership item, the common shop towel, showed a cost of nearly $4 in energy expenditure for manufacture, use, laundry and re-use over its lifetime. This is a cost borne by the auto owner and typically showing up on repair orders as “shop expenses” for fixing or repairing a customer’s vehicle.

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Division	Model	Dealer Share of Tran Prc for Energy	Dealer $ Energy Cost	Dealer Service	Dealer Service
Kia	Rio	13.93%	$ 547.17	$ 3,045.40	1.95%
Hyundai	Accent	13.78%	$ 478.58	$ 2,715.73	2.11%
Chevrolet	Aveo	13.54%	$ 421.91	$ 1,639.78	1.51%
Toyota	Echo	14.88%	$ 426.16	$ 1,743.62	1.58%
	Total Budget Cars	**14.03%**	**$ 468.45**	**$ 2,286.13**	**1.79%**
Chevrolet	Cobalt	13.20%	$ 544.90	$ 2,602.51	1.52%
Toyota	Matrix **	11.90%	$ 490.40	$ 2,801.80	1.71%
Mazda	Mazda3	10.76%	$ 429.54	$ 3,165.36	1.97%
Nissan	Sentra	10.88%	$ 426.60	$ 2,919.68	1.85%
Suzuki	Aerio	11.48%	$ 415.46	$ 2,203.09	1.56%
Mitsubishi	Lancer	11.61%	$ 412.74	$ 2,405.12	1.79%
Kia	Spectra	13.13%	$ 462.31	$ 2,894.55	2.12%
Scion	tC	14.73%	$ 506.86	$ 1,878.20	1.60%
Suzuki	Forenza	14.31%	$ 489.55	$ 1,800.96	1.50%
Ford	Focus	14.12%	$ 461.87	$ 2,659.17	1.96%
Mazda	Protégé	14.18%	$ 446.24	$ 1,927.42	1.55%
Pontiac	Sunfire	12.22%	$ 377.23	$ 2,164.86	1.82%
Chevrolet	Cavalier	10.37%	$ 320.02	$ 2,279.44	1.98%
Scion	xA	14.24%	$ 426.77	$ 2,432.60	2.12%
Toyota	Corolla	12.99%	$ 387.49	$ 2,474.53	2.00%
Dodge	Neon	10.68%	$ 316.77	$ 2,219.33	2.06%
Hyundai	Elantra	14.09%	$ 415.23	$ 2,073.92	1.77%
Saturn	Ion	14.34%	$ 414.14	$ 2,122.55	1.86%
Ford	Escort	12.89%	$ 298.40	$ 1,669.04	1.53%
Scion	xB	12.13%	$ 236.17	$ 1,797.23	1.99%
	Total Economy Cars	**12.71%**	**$ 413.93**	**$ 2,324.57**	**1.81%**
Nissan	Xterra	15.38%	$ 1,266.85	$ 6,139.35	1.59%
Isuzu	Trooper	13.34%	$ 1,037.45	$ 6,781.56	1.70%
Mazda	Mazda5	10.91%	$ 746.57	$ 5,887.34	2.05%
Isuzu	Rodeo	11.37%	$ 714.15	$ 3,970.98	1.40%
Suzuki	XL-7	11.99%	$ 721.56	$ 4,484.11	1.84%
Suzuki	Grand Vitara	15.42%	$ 888.50	$ 3,869.12	1.60%
Kia	Sorento	16.14%	$ 867.85	$ 3,302.45	1.75%
Chevrolet	Blazer	14.63%	$ 772.17	$ 4,737.80	1.75%
Suzuki	Vitara	12.97%	$ 664.19	$ 3,733.30	1.88%
Isuzu	Rodeo Sport	15.53%	$ 775.10	$ 4,187.05	2.11%
Kia	Sportage	14.96%	$ 712.25	$ 3,344.19	1.80%
Jeep	Liberty	12.88%	$ 576.90	$ 3,926.70	1.89%
Chevrolet	Tracker	13.73%	$ 388.28	$ 1,890.22	1.78%
Jeep	Wrangler	14.06%	$ 346.02	$ 1,887.91	1.51%

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	Ttl Entry Level SUVs	**13.81%**	**$**	**748.42**	**$ 4,153.00**	**1.76%**
Mitsubishi	Outlander	15.73%	$	1,452.51	$ 6,552.71	1.58%
Hyundai	Tucson	15.52%	$	1,400.84	$ 5,207.11	1.61%
Mazda	Tribute	12.82%	$	1,155.21	$ 6,361.29	1.88%
Hyundai	Santa Fe	15.04%	$	1,237.34	$ 5,975.81	1.96%
Pontiac	Torrent	15.77%	$	1,268.38	$ 6,811.38	2.13%
Ford	Escape	16.33%	$	1,297.75	$ 6,876.95	2.19%
Mercury	Mariner	14.88%	$	1,181.17	$ 6,207.16	2.11%
Toyota	RAV4	11.35%	$	900.85	$ 6,216.70	1.97%
Saturn	Vue	14.82%	$	1,115.50	$ 4,134.14	1.39%
Chevrolet	Equinox	11.74%	$	871.23	$ 6,540.34	1.90%
Honda	Element	13.12%	$	965.76	$ 5,028.10	1.96%
Pontiac	Aztek	14.37%	$	902.72	$ 4,895.44	1.89%
Honda	CR-V	10.16%	$	611.73	$ 4,656.58	2.02%
	Ttl Entry Level Sportwagons	**13.97%**	**$**	**1,104.69**	**$ 5,804.90**	**1.89%**
Nissan	Titan	10.43%	$	1,143.55	$ 6,230.16	1.37%
Toyota	Tundra	14.62%	$	1,494.60	$ 9,488.54	1.98%
Dodge	Ram pickup	15.05%	$	1,523.21	$12,623.53	2.20%
Chevrolet	Silverado	14.49%	$	1,446.54	$ 9,603.41	1.64%
GMC	Sierra	16.50%	$	1,647.20	$ 7,844.24	1.38%
Ford	F Series	16.25%	$	1,583.73	$11,410.48	1.78%
	Ttl Full Size Pickup	**14.56%**	**$**	**1,473.14**	**$ 9,533.39**	**1.73%**
GMC	Savana/G Van	14.97%	$	1,641.76	$10,688.88	1.46%
Ford	Econoline/Club Wagon	12.20%	$	1,335.41	$10,812.41	1.56%
GMC	Express/G Van	10.95%	$	1,107.48	$12,811.39	2.04%
Dodge	Sprinter Van	10.83%	$	1,067.95	$18,072.77	1.96%
Dodge	Ram Van	14.55%	$	1,343.98	$10,652.46	2.07%
Ford	Econoline van	13.56%	$	1,212.67	$10,793.20	1.75%
	Full Size Van	**12.84%**	**$**	**1,284.88**	**$12,305.18**	**1.81%**
Honda	Accord Hybrid	18.27%	$	2,452.56	$13,761.27	3.57%
Toyota	Prius	19.46%	$	2,576.11	$14,377.97	4.06%
Honda	Civic Hybrid	17.44%	$	2,300.68	$11,942.50	3.26%
Ford	Escape Hybrid	18.61%	$	2,394.25	$15,434.85	3.44%
Mercury	Mariner Hybrid	18.78%	$	2,412.63	$15,168.52	3.48%
Honda	Insight	16.29%	$	1,950.56	$10,923.02	3.41%
Lexus	RX 400h	17.32%	$	5,476.82	$23,243.38	3.06%
Toyota	Highlander Hybrid	16.56%	$	3,353.18	$11,971.00	3.12%
	Ttl Hybrids	**17.84%**	**$**	**2,864.60**	**$14,602.81**	**3.43%**
Volkswagen	Phaeton	10.37%	$	4,737.64	$52,153.10	1.93%
Audi	allroad quattro	10.74%	$	2,448.51	$18,988.03	1.68%
Audi	A6	15.54%	$	3,142.65	$13,508.04	1.44%
Lexus	LS 430	12.27%	$	2,366.51	$17,311.55	1.64%
Lexus	GS 430	10.98%	$	1,975.63	$13,907.66	1.74%
Infiniti	Q45	12.51%	$	2,162.73	$14,583.43	1.71%
Jaguar	S-Type	15.11%	$	2,456.13	$ 9,281.38	1.41%

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Infiniti	M45	10.16%	$ 1,604.57	$ 6,934.99	1.42%
Lexus	GS 300	12.29%	$ 1,933.59	$10,470.70	2.07%
Cadillac	DTS	11.75%	$ 1,661.80	$11,277.53	1.71%
Cadillac	DeVille	10.34%	$ 1,426.09	$ 9,757.40	1.42%
M-Benz	E class	10.97%	$ 1,480.62	$12,296.11	1.45%
Cadillac	Seville	14.25%	$ 1,919.19	$11,887.59	2.22%
Volvo	80 series	11.42%	$ 1,535.88	$ 9,334.52	1.40%
Cadillac	STS	14.19%	$ 1,835.76	$13,579.23	1.98%
BMW	5 Series	13.72%	$ 1,755.20	$13,583.50	2.09%
Acura	RL	12.91%	$ 1,452.89	$ 9,467.16	2.09%
Lincoln	Town Car	10.88%	$ 1,221.93	$12,737.01	2.11%
BMW	M3	15.17%	$ 1,685.54	$ 7,448.09	1.91%
	Total Luxury Car	**12.40%**	**$ 2,042.26**	**$14,131.95**	**1.76%**
Volkswagen	Golf	16.53%	$ 1,816.48	$ 8,755.81	2.15%
Volkswagen	Golf GTI	16.34%	$ 1,837.60	$ 8,035.61	2.02%
Saturn	L series	11.16%	$ 1,152.16	$ 6,316.23	1.52%
Honda	Civic	16.35%	$ 1,612.27	$ 8,486.52	1.97%
Chevrolet	HHR	14.97%	$ 2,611.07	$ 6,481.49	1.60%
Pontiac	G6	12.45%	$ 1,188.10	$ 8,006.51	2.15%
Chevrolet	Classic	10.99%	$ 1,016.03	$10,807.58	2.08%
Subaru	Impreza	11.04%	$ 1,000.67	$ 4,175.26	1.37%
Pontiac	Grand Am	10.80%	$ 978.70	$ 7,131.23	1.67%
Ford	Fusion	13.11%	$ 1,176.36	$ 6,342.39	1.50%
Mercury	Milan	10.36%	$ 929.60	$ 7,616.81	1.83%
Dodge	Stratus	16.21%	$ 1,429.88	$ 6,875.33	1.58%
Kia	Optima	14.72%	$ 1,195.85	$ 6,933.81	2.16%
Hyundai	Sonata	13.22%	$ 1,066.46	$ 4,522.40	1.41%
Suzuki	Verona	10.61%	$ 824.72	$ 4,146.59	1.43%
Volkswagen	Beetle	11.67%	$ 869.18	$ 6,532.88	2.09%
Pontiac	Vibe	16.28%	$ 670.90	$ 2,377.41	1.46%
Chevrolet	Malibu	12.00%	$ 938.28	$ 6,568.72	2.10%
Chrysler	PT Cruiser	16.46%	$ 1,081.09	$ 4,394.86	1.42%
Chrysler	Sebring	11.77%	$ 615.45	$ 3,135.97	1.49%
	Ttl Lower Mid-Range Cars	**13.35%**	**$ 1,200.54**	**$ 6,382.17**	**1.75%**
Nissan	Pathfinder	12.95%	$ 1,171.46	$ 6,243.91	1.78%
Toyota	4Runner	13.97%	$ 1,248.50	$ 6,330.98	1.64%
Mitsubishi	Montero	10.99%	$ 974.70	$ 6,082.99	1.78%
Mitsubishi	Montero Sport	16.10%	$ 1,392.81	$ 6,180.61	2.05%
Isuzu	Axiom	14.79%	$ 1,045.51	$ 4,089.56	1.66%
Land Rover	Freelander	15.50%	$ 1,057.26	$ 5,395.83	2.04%
Isuzu	Ascender	14.55%	$ 907.63	$ 4,288.87	1.74%
Jeep	Commander	13.04%	$ 813.30	$ 5,699.21	1.79%
Jeep	Grand Cherokee	12.15%	$ 740.06	$ 4,374.07	1.40%
Jeep	Grand Cherokee SRT-8	10.24%	$ 710.96	$ 5,592.98	1.81%
Dodge	Durango	13.14%	$ 764.88	$ 5,178.50	1.97%
Ford	Explorer	11.38%	$ 650.82	$ 6,182.99	2.17%
Chevrolet	TrailBlazer	10.65%	$ 591.50	$ 3,670.56	1.44%
	Ttl Lower Mid-Range SUV	**13.03%**	**$ 928.41**	**$ 5,331.62**	**1.79%**

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Toyota	Sequoia	10.35%	$	1,548.67	$12,531.81	1.95%
Nissan	Armada	10.42%	$	1,464.64	$ 9,779.97	1.75%
Ford	Excursion	15.50%	$	2,086.61	$16,530.94	1.86%
Chevrolet	Suburban	14.80%	$	1,889.66	$12,358.97	1.45%
GMC	Yukon XL	16.09%	$	2,053.41	$15,702.99	1.85%
Ford	Expedition	14.37%	$	1,790.65	$14,417.90	1.66%
Chevrolet	Tahoe	10.93%	$	1,307.99	$15,899.89	2.02%
GMC	Yukon	10.94%	$	1,308.64	$15,326.34	1.97%
	Total Large SUV	**12.93%**	**$**	**1,681.28**	**$14,068.60**	**1.81%**
Chrysler	Pacifica	15.97%	$	1,808.92	$10,632.49	2.09%
Nissan	Murano	12.29%	$	1,256.78	$ 7,281.75	1.63%
Toyota	Highlander	12.87%	$	1,305.53	$ 7,029.67	1.81%
Ford	Freestyle/Windstar	14.51%	$	1,466.96	$ 8,229.38	1.61%
Buick	Rendezvous	11.11%	$	1,082.89	$ 5,827.35	1.45%
Honda	Pilot	14.92%	$	1,335.79	$ 5,690.15	1.66%
Mitsubishi	Endeavor	16.45%	$	1,323.07	$ 6,493.38	2.15%
	Total Mid-Range Sportwagons	**14.02%**	**$**	**1,368.56**	**$ 7,312.02**	**1.77%**
Volkswagen	EuroVan/T4	10.82%	$	1,011.35	$ 7,404.37	2.03%
Honda	Odyssey	15.21%	$	1,404.80	$ 6,049.54	1.39%
Pontiac	Montana SV6	10.55%	$	962.58	$ 7,211.37	1.94%
Chrysler	Town & Country	13.59%	$	1,228.26	$ 6,448.22	1.70%
Buick	Terraza	14.97%	$	1,348.95	$ 7,442.29	1.88%
Dodge	Caravan/Grand Caravan	14.55%	$	1,292.91	$ 5,507.99	1.54%
Toyota	Sienna	14.69%	$	1,304.91	$ 7,302.56	2.12%
Chevrolet	Venture	14.93%	$	1,303.99	$ 6,712.13	1.81%
Saturn	Relay	11.18%	$	976.24	$ 6,943.55	2.00%
Pontiac	Montana	14.45%	$	1,261.34	$ 7,432.61	2.09%
Nissan	Quest	12.69%	$	1,095.02	$ 5,489.31	1.62%
Chevrolet	Uplander	13.95%	$	1,203.47	$ 6,209.62	1.88%
Ford	Freestar	14.19%	$	1,196.08	$ 4,896.01	1.47%
Mercury	Monterey	14.97%	$	1,261.82	$ 7,038.98	2.14%
Kia	Sedona	10.31%	$	837.58	$ 4,622.54	1.68%
Mazda	MPV	12.00%	$	954.72	$ 4,630.05	1.52%
GMC	Safari	10.76%	$	756.21	$ 6,898.76	1.98%
Chevrolet	Astro	11.59%	$	814.43	$ 5,267.84	1.49%
	Total Minivans	**13.08%**	**$**	**1,123.04**	**$ 6,305.99**	**1.79%**
Volvo	70 series	13.66%	$	1,381.57	$ 9,413.93	2.05%
Volvo	60 series	15.93%	$	1,472.57	$ 7,597.52	2.08%
Mercury	Zephyr	12.49%	$	1,117.48	$ 7,861.10	2.00%
Acura	TL	11.03%	$	953.76	$ 7,439.40	2.05%
Acura	CL	14.02%	$	1,154.97	$ 8,132.20	2.21%
Lincoln	LS	10.39%	$	853.95	$ 4,657.23	1.48%
Jaguar	X-Type	10.58%	$	822.70	$ 6,063.50	1.88%
Lexus	ES 330	14.72%	$	1,110.77	$ 4,810.00	1.51%
Lexus	IS 300	16.49%	$	1,231.47	$ 6,146.28	2.07%
Infiniti	G35	16.07%	$	1,163.63	$ 4,737.85	1.55%

M-Benz	C class	11.57%	$	801.11	$ 5,579.27	1.92%
Cadillac	CTS	12.90%	$	883.26	$ 4,409.47	1.64%
BMW	330	10.24%	$	674.41	$ 4,523.29	1.59%
Buick	Park Avenue	10.70%	$	678.49	$ 5,432.10	1.95%
BMW	325	13.29%	$	828.90	$ 4,449.83	1.70%
Saab	9-5	13.59%	$	846.79	$ 5,078.66	2.05%
	Total Near Luxury Cars	**12.98%**	**$**	**998.49**	**$ 6,020.73**	**1.86%**
Audi	A8	11.18%	$	2,261.38	$17,635.02	1.66%
M-Benz	S class	15.03%	$	2,246.83	$14,365.91	1.56%
Maserati	Maserati	15.20%	$	1,891.79	$ 7,620.58	1.54%
BMW	7 Series	14.95%	$	1,788.32	$ 8,733.42	1.48%
Jaguar	XJ	14.71%	$	1,669.14	$ 7,714.62	1.71%
	Total Premium Cars	**14.21%**	**$**	**1,971.49**	**$11,213.91**	**1.59%**
Mercury	Montego	10.40%	$	959.19	$ 6,193.14	1.80%
Buick	LaCrosse	12.10%	$	1,106.79	$ 7,630.49	2.06%
Volkswagen	Passat	10.61%	$	887.10	$ 5,555.22	1.41%
Dodge	Magnum	13.47%	$	1,108.18	$ 6,022.86	1.63%
Ford	Five Hundred	15.54%	$	1,277.85	$ 6,144.05	1.77%
Dodge	Charger	14.22%	$	1,143.57	$ 5,431.69	1.60%
Nissan	Maxima	12.48%	$	999.52	$ 6,563.03	1.73%
Chrysler	300/300M	13.35%	$	1,066.93	$ 8,209.86	2.18%
Mitsubishi	Diamante	10.49%	$	825.77	$ 5,747.13	1.97%
Volvo	40 series	15.77%	$	1,218.71	$ 6,053.00	1.97%
Infiniti	I30/I35	12.07%	$	910.20	$ 5,636.69	1.62%
Mazda	Millenia	10.30%	$	756.23	$ 4,852.23	1.98%
Audi	A4/S4	11.32%	$	818.21	$ 6,445.64	2.15%
Audi	S4	10.23%	$	795.59	$ 4,567.27	1.41%
Acura	TSX	12.87%	$	904.63	$ 3,994.14	1.37%
Saab	9-3	14.49%	$	965.90	$ 5,627.57	1.89%
Saab	9-2	11.90%	$	752.79	$ 4,752.27	1.79%
Buick	Regal	13.05%	$	620.27	$ 3,918.56	2.21%
	Total Premium Mid-Range Cars	**12.48%**	**$**	**950.97**	**$ 5,741.38**	**1.81%**
M-Benz	SLK class	10.83%	$	1,756.95	$10,002.49	1.58%
M-Benz	CLS class	15.75%	$	2,353.68	$16,080.87	1.85%
M-Benz	CLK class	11.02%	$	1,567.82	$12,604.66	1.89%
Porsche	Boxster	10.30%	$	1,352.91	$ 9,261.97	1.83%
Chevrolet	Corvette	15.55%	$	2,000.97	$ 8,851.05	1.73%
Audi	TT	16.20%	$	1,827.20	$ 5,581.47	1.43%
BMW	Z8	15.39%	$	1,713.83	$ 7,933.58	1.64%
BMW	Z4	10.23%	$	1,034.97	$ 7,664.98	2.10%
Ford	Thunderbird	14.58%	$	877.28	$ 4,368.63	1.73%
Chrysler	Crossfire	15.04%	$	810.81	$ 3,657.17	2.11%
	Total Premium Sporty Cars	**13.49%**	**$**	**1,529.64**	**$ 8,600.69**	**1.79%**
Porsche	Cayenne	11.70%	$	1,060.37	$13,603.03	1.70%
Volkswagen	Touareg	12.83%	$	2,161.09	$13,994.33	1.82%
Land Rover	Range Rover	10.24%	$	1,575.22	$16,721.27	2.15%

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M-Benz	G class	12.39%	$	1,873.24	$18,028.01	2.05%
Hummer	H1	12.76%	$	1,822.26	$20,988.31	1.58%
Lexus	LX 470	15.86%	$	2,086.70	$14,237.36	2.07%
Cadillac	Escalade ESV	14.27%	$	1,858.67	$16,232.15	2.17%
Toyota	Land Cruiser	10.17%	$	1,319.35	$14,471.26	1.51%
Hummer	H2	11.00%	$	1,356.52	$ 8,407.01	1.41%
Cadillac	Escalade	10.67%	$	1,196.75	$12,500.06	1.90%
Lincoln	Navigator	13.57%	$	1,446.83	$ 8,573.24	1.63%
	Total Premium SUV	**12.31%**	**$**	**1,614.27**	**$ 14,341**	**1.82%**
Volvo	XC90	12.31%	$	1,667.51	$16,216.19	2.13%
Lexus	RX330	16.45%	$	2,215.98	$ 9,775.62	1.54%
Infiniti	FX35	10.64%	$	1,313.30	$ 8,961.60	1.71%
Infiniti	FX45	16.31%	$	2,134.82	$11,631.81	2.01%
M-Benz	R class	15.10%	$	1,821.36	$ 9,127.33	1.88%
Volvo	50 series	15.47%	$	1,851.29	$ 8,292.99	1.81%
Acura	MDX	12.79%	$	1,482.62	$ 9,930.44	1.79%
Cadillac	SRX	16.10%	$	1,825.26	$ 9,420.68	1.98%
M-Benz	M class	15.33%	$	1,550.02	$ 9,229.99	1.73%
BMW	X5	11.44%	$	1,103.73	$ 6,328.40	1.61%
BMW	X3	13.06%	$	1,204.92	$ 6,919.96	1.83%
	Total Premium Sportwagons	**14.09%**	**$**	**1,651.89**	**$ 9,621**	**1.82%**
Honda	Accord	10.41%	$	924.62	$ 9,294.15	2.04%
Volkswagen	Jetta wagon	14.26%	$	1,188.86	$ 6,038.53	2.17%
Volkswagen	Jetta	16.14%	$	1,325.74	$ 5,215.64	1.96%
Toyota	Camry	16.02%	$	1,275.35	$ 8,588.32	2.22%
Subaru	Baja	11.95%	$	929.59	$ 4,256.32	1.42%
Subaru	Legacy	16.44%	$	1,238.59	$ 4,009.48	1.39%
Subaru	Forester	11.56%	$	859.83	$ 5,903.63	1.96%
Subaru	Outback	10.94%	$	791.62	$ 4,511.54	1.60%
Mazda	Mazda6	15.56%	$	1,138.84	$ 4,743.26	1.63%
Dodge	Intrepid	10.68%	$	771.20	$ 6,750.78	2.14%
Chevrolet	Monte Carlo	13.80%	$	846.91	$ 5,323.31	1.87%
Mitsubishi	Galant	13.40%	$	799.85	$ 4,460.35	1.99%
Pontiac	Grand Prix	15.27%	$	911.31	$ 5,117.25	2.17%
Buick	Century	12.14%	$	719.66	$ 3,974.47	1.57%
Mercury	Sable	11.47%	$	676.39	$ 4,945.37	1.70%
Ford	Taurus	14.56%	$	858.02	$ 5,482.06	1.84%
Mazda	626	15.68%	$	892.35	$ 4,633.50	1.94%
Nissan	Altima	10.59%	$	596.01	$ 3,719.47	1.76%
Chevrolet	Impala	12.66%	$	699.97	$ 3,470.85	1.47%
Hyundai	XG350	10.85%	$	568.21	$ 4,172.73	2.15%
Kia	Amanti	13.18%	$	678.24	$ 3,048.55	1.49%
	Total Small Rid-Range Cars	**13.22%**	**$**	**890.05**	**$ 5,126.65**	**1.83%**
Chevrolet	SSR	13.16%	$	1,309.29	$ 5,377.23	1.54%
Honda	Ridgeline	16.20%	$	1,192.81	$ 5,066.33	1.72%
GMC	Canyon	14.64%	$	765.53	$ 3,570.76	1.48%
GMC	Sonoma	12.43%	$	649.96	$ 4,415.71	1.84%

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Nissan	Frontier	12.07%	$ 570.43	$ 4,046.16	2.04%
Toyota	Tacoma	10.76%	$ 502.81	$ 4,365.03	2.20%
Chevrolet	Colorado	12.88%	$ 590.29	$ 3,414.87	1.65%
Mitsubishi	Raider	12.79%	$ 585.91	$ 2,852.92	1.45%
Mazda	B-Series	14.39%	$ 638.05	$ 3,192.41	1.52%
Dodge	Dakota	16.31%	$ 673.77	$ 2,755.26	1.58%
Ford	Ranger	16.23%	$ 640.44	$ 3,841.67	2.11%
Chevrolet	S10	14.16%	$ 449.58	$ 1,956.81	1.46%
	Total Small Pickup	**13.84%**	**$ 714.07**	**$ 3,737.93**	**1.72%**
Cadillac	Escalade EXT	15.71%	$ 1,310.84	$ 7,422.21	1.64%
Chevrolet	Avalanche	11.23%	$ 905.25	$ 7,036.73	1.52%
Lincoln	Mark LT	15.62%	$ 1,236.95	$ 7,276.60	1.95%
	Total Specialty Utility Pickup	**14.19%**	**$ 1,151.01**	**$ 7,245.18**	**1.70%**
Mazda	RX8	12.55%	$ 1,269.31	$ 6,348.60	1.84%
Nissan	350Z	12.45%	$ 1,112.28	$ 7,354.14	2.15%
Audi	A3	14.21%	$ 1,213.68	$ 4,661.93	1.60%
Mitsubishi	Eclipse Spyder	10.67%	$ 903.86	$ 4,379.03	1.77%
Mitsubishi	Eclipse	14.83%	$ 1,220.95	$ 4,219.02	1.45%
Pontiac	GTO	11.07%	$ 899.66	$ 6,057.16	2.08%
Toyota	Celica	11.43%	$ 916.80	$ 4,268.65	1.56%
Mini	Mini Cooper S	15.95%	$ 1,239.79	$ 5,866.38	1.91%
Acura	RSX	11.46%	$ 890.79	$ 5,399.19	1.78%
Pontiac	Solstice	12.61%	$ 966.05	$ 4,516.47	1.57%
Mini	Mini Cooper	12.74%	$ 931.93	$ 6,280.50	2.07%
Ford	Mustang	13.62%	$ 975.60	$ 4,709.32	1.48%
Toyota	MR2 Spyder	12.41%	$ 850.83	$ 3,925.28	1.44%
Mazda	MX-5 Miata	13.84%	$ 829.29	$ 4,924.74	1.84%
Honda	S2000	14.08%	$ 834.66	$ 5,185.24	2.20%
Hyundai	Tiburon	11.26%	$ 660.06	$ 4,613.03	1.67%
Pontiac	Firebird	15.87%	$ 832.22	$ 4,720.27	2.12%
Chevrolet	Camaro	10.87%	$ 569.37	$ 4,901.41	2.13%
	Total Touring	**12.88%**	**$ 950.95**	**$ 5,129.46**	**1.81%**
Toyota	Avalon	14.51%	$ 1,163.12	$ 6,326.98	1.60%
Buick	Lucerne	12.69%	$ 931.70	$ 4,720.33	1.48%
Pontiac	Bonneville	15.32%	$ 1,112.39	$ 6,848.41	2.10%
Chrysler	Concorde	12.50%	$ 779.88	$ 5,324.05	1.90%
Mercury	Grand Marquis	15.17%	$ 876.37	$ 5,899.18	2.01%
Ford	Crown Victoria	10.28%	$ 593.46	$ 6,578.16	2.19%
Buick	LeSabre	15.02%	$ 839.77	$ 4,921.75	1.96%
	Total Traditional Car	**13.64%**	**$ 899.53**	**$ 5,802.69**	**1.89%**
Maybach	Maybach	10.14%	$ 4,785.27	$42,268.07	1.42%
Rolls-Royce	Rolls-Royce	15.04%	$ 6,532.62	$52,674.89	1.81%
Bentley	Bentley	15.83%	$ 6,808.17	$46,912.11	1.64%
Porsche	Carrera GT	11.35%	$ 2,093.85	$15,411.18	1.83%
Lamborghini	Lamborghini	12.54%	$ 2,048.16	$ 7,518.06	1.55%
Ferrar	Ferrari	13.38%	$ 2,159.93	$ 8,486.46	1.80%

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Ford	GT	16.39%	$ 2,571.59	$ 7,504.35	1.68%
Aston Martin	Aston Martin	11.17%	$ 1,378.15	$ 7,652.56	1.62%
	Total Ultra Luxury	**13.23%**	**$ 3,547.22**	**$23,553.46**	**1.67%**
Lexus	GX 470	11.77%	$ 1,288.34	$ 7,940.86	1.67%
Land Rover	Discovery	12.93%	$ 1,330.24	$ 7,380.95	1.44%
Land Rover	LR3	13.78%	$ 1,397.71	$ 8,565.91	1.55%
Infiniti	QX4	10.63%	$ 1,075.44	$ 7,873.55	2.10%
Land Rover	Range Rover Sport	13.84%	$ 1,364.90	$10,221.36	2.05%
Lincoln	Aviator	14.71%	$ 1,406.72	$ 7,351.81	1.64%
Mercury	Mountaineer	11.67%	$ 1,110.63	$ 6,909.79	1.73%
Subaru	B9 Tribeca	12.23%	$ 1,116.35	$ 5,104.43	1.55%
GMC	Envoy	16.37%	$ 1,464.46	$ 6,830.05	1.54%
Buick	Rainier	13.29%	$ 1,180.42	$ 7,980.12	2.08%
Saab	9-7X	14.93%	$ 1,319.36	$ 5,613.61	1.81%
Hummer	H3	10.74%	$ 853.08	$ 8,675.93	2.15%
	Total Upper Mid-Range SUV	**13.07%**	**$ 1,242.30**	**$ 7,537.36**	**1.78%**
Acura	NSX	11.41%	$ 2,070.00	$15,046.02	1.76%
M-Benz	SC 430	12.51%	$ 1,736.51	$12,141.74	2.16%
Cadillac	XLR	13.27%	$ 1,771.41	$10,799.69	2.01%
Jaguar	XK	11.78%	$ 1,467.91	$10,809.14	1.88%
Porsche	911 Carrera 4	11.14%	$ 1,284.66	$ 8,846.56	2.07%
Porsche	911 Carrera	14.51%	$ 1,618.59	$ 8,396.10	1.87%
M-Benz	SL Coupe/Roadster	11.30%	$ 1,236.67	$ 8,533.82	1.88%
M-Benz	CL class	15.13%	$ 1,561.26	$ 8,046.46	1.69%
BMW	6 Series	15.08%	$ 1,392.94	$ 7,569.32	1.93%
Lotus	Lotus	15.47%	$ 1,428.96	$ 4,059.76	1.48%
Dodge	Viper	12.52%	$ 1,110.15	$ 3,928.92	1.53%
	Total Upper Premium Sportscars	**13.10%**	**$ 1,516.28**	**$ 8,925.23**	**1.84%**
	Industry Straight Average	**14.38%**	**$ 1,361.45**	**$ 8,398.78**	**1.98%**

CHAPTER 11 – Recyclables

Among the most expensive energy components in the Dust to Dust study was in the recycle, non-recycle and re-use components. We'll break that down beginning with recyclables.

The industry and the recycle scrap industries have all improved the technology and efficiency of recycling parts and components, especially hard metals and plastics. In all, the industry is among the best at this primarily because there is a ready market for such recycled materials and the materials are in significant quantities to justify the expense of recycling. That is, with volume of recyclables comes the ability to support new products from recycled material. Tires are a good example. If only a handful of tires were available, there would be no justification for finding ways of using the material as a road-building component. The ready supply and new techniques for efficiently reducing the bulk to reusable grist created a new industry.

Current hybrids have components that are capable of being recycled in a higher proportion of their total social energy costs than non-hybrid models. Light-weight metals (rather than the sound-deadening metals now common in conventional vehicles) and plastics currently have higher desirability so more of the hybrid's non-electronic components can be bought and sold more readily in the scrappage and recycling industry.

With that comes a price, though. It is more energy intense to recycle high-tech electronics, battery(ies), related components, motors, controller(s) and small items such as special gauges and regenerative braking parts.

In all, while the industry as a whole the cost of recycling is about $119,000 per vehicle, hybrids cost more than $140,000 per vehicle to recycle. Again, the owners of the vehicles do not pay this amount. Recyclers pay and resell at a typical 11 percent profit margin over and above their total expenses.

How can a vehicle costing $30,000 generate $140,000 in recyclables?

Remember that we are discussing energy usage, not the cost of the vehicle. Over time, for instance, the vehicle will sell on average of five times in its lifetime, each time at a portion of its original cost but generally bringing the lifetime expenditure for the vehicle into the two to four times original cost range depending on desirability and demand.

We are also discussing energy consumption, not costs. That $140,000 in recyclable energy costs will generate $160,000 to $220,000 in net revenue to recyclers. Additionally, the support industries to recyclers expend significant energy for the production and maintenance of necessary recycling equipment. Government agencies and those who remanufacture recycled material into other products similarly expend significant quantities of energy in support of the recycling of a single car.

The reason we include all of this into the vehicle’s social energy cost is simple: As with research and development, we cannot be certain that recycled material will ever get into secondary products.

Tires are a good example. Scrap yards once accumulated acres upon acres of used tires and eventually simply burned them as a disposal method. Today, about 20 percent of those tires are recycled into everything from road-maintenance pavement to fish habitat.

But such recycling demands energy expenditures. Shredding a tire worth $2 at wholesale as scrap costs about $2.90 in energy to total expenditures but the resulting material can be sold for approximately $3.10. Governments or taxes of all sorts pay roughly 83 cents in energy costs to support that single recycled tire but receive 91 cents of savings if the tire is used as a component of road-paving material, our analysis shows.

Similarly, we have included the recycling of components taken in on repair and maintenance such as oil, tires, and batteries over the lifetime of the vehicle, not just the last stage just prior to disposal of the entire car or truck.

Lead-acid batteries, for example, are replaced approximately 3.6 times during the life of a vehicle on average. Roughly 24 percent are recycled, 18 percent re-used after refurbishment and the rest are either stored or sent to landfills by the owners. To produce a single replacement wiper blade costs 0.19 cents of energy (rubber or rubber like material, plastic or metal frame, packaging, distribution, stocking, installation and disposal).

Many of these costs are passed along to consumers; much of the technology is leveraged against other products or product categories; some are simply paid for by society in general through gasoline or other taxes.

The point is this: Recycling of an automobile is both supported by and supportive of other industries. Such recycling can reduce the what would be the new-product or non-recycled cost of other goods or services to consumers or governments.

In many cases, such recycling generates all-new products or packaging technologies or spawns entirely new ways of producing competitive products in seemingly old industries. Example: One company was built on entirely on the use of recycled paper and paper goods for greeting cards, a product category dominated by Hallmark. So successful was the idea that the owner and founder of that company became extraordinarily wealthy and went on to build top rated golf courses including Bandon Dunes which is within walking distance of CNW offices.

Did the newspaper reader pay for the energy of anything more than the half-dollar for the original edition? Did that reader expect his daily habit of reading sports would result in a new and lucrative greeting card company?

Unlikely.

But the high volume of newspaper material supported generally low prices for cast off material that allowed one entrepreneur to compete successfully against the long-time greeting card giant.

All of this required energy expenditures not paid for by the original newspaper reader. So, too, with automobiles. Cadres of engineers, backyard scientists, tinkers and conglomerates are expending huge quantities of energy devising new ways to recycle automotive components.

Toyota currently has the most sophisticated methods of disposing of the nickel batteries found in Prius. But to do so today is likely to remain energy intense and unprofitable until the quantity of such batteries is high enough to encourage others to invest in the development of better recycling methods. CNW calculates that it costs $3 in energy to recycle a conventional lead acid battery and more than $93 for the Prius battery.

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Division	Model	Recycleables Disposal	Recycleables Disposal
Kia	Rio	$ 38,699.95	24.78%
Hyundai	Accent	$ 38,161.82	29.65%
Chevrolet	Aveo	$ 28,799.30	26.52%
Toyota	Echo	$ 29,431.90	26.67%
	Total Budget Cars	**$ 33,773.24**	**26.91%**
Chevrolet	Cobalt	$ 46,023.36	26.88%
Toyota	Matrix **	$ 41,191.30	25.14%
Mazda	Mazda3	$ 43,045.69	26.79%
Nissan	Sentra	$ 46,115.14	29.22%
Suzuki	Aerio	$ 39,133.15	27.71%
Mitsubishi	Lancer	$ 39,637.38	29.50%
Kia	Spectra	$ 32,099.51	23.51%
Scion	tC	$ 26,177.43	22.30%
Suzuki	Forenza	$ 31,192.55	25.98%
Ford	Focus	$ 31,706.52	23.37%
Mazda	Protégé	$ 33,325.76	26.80%
Pontiac	Sunfire	$ 29,558.70	24.85%
Chevrolet	Cavalier	$ 29,149.15	25.32%
Scion	xA	$ 27,309.32	23.80%
Toyota	Corolla	$ 31,278.05	25.28%
Dodge	Neon	$ 27,870.96	25.87%
Hyundai	Elantra	$ 30,862.67	26.34%
Saturn	Ion	$ 28,939.76	25.36%
Ford	Escort	$ 23,290.17	21.35%
Scion	xB	$ 26,687.50	29.55%
	Total Economy Cars	**$ 33,229.70**	**25.75%**
Nissan	Xterra	$ 87,842.86	22.75%
Isuzu	Trooper	$ 115,446.17	28.94%
Mazda	Mazda5	$ 66,110.52	23.02%
Isuzu	Rodeo	$ 82,993.40	29.26%
Suzuki	XL-7	$ 62,850.70	25.79%
Suzuki	Grand Vitara	$ 51,628.54	21.35%
Kia	Sorento	$ 48,838.57	25.88%
Chevrolet	Blazer	$ 78,674.48	29.06%
Suzuki	Vitara	$ 56,714.31	28.56%
Isuzu	Rodeo Sport	$ 52,050.33	26.23%
Kia	Sportage	$ 52,262.20	28.13%
Jeep	Liberty	$ 50,714.63	24.41%
Chevrolet	Tracker	$ 29,542.73	27.82%
Jeep	Wrangler	$ 31,344.32	25.07%
	Ttl Entry Level SUVs	**$ 61,929.55**	**26.16%**
Mitsubishi	Outlander	$ 120,561.49	29.07%
Hyundai	Tucson	$ 91,593.37	28.32%

Mazda	Tribute	$ 94,099.65	27.81%
Hyundai	Santa Fe	$ 83,661.41	27.44%
Pontiac	Torrent	$ 77,195.67	24.14%
Ford	Escape	$ 82,303.58	26.21%
Mercury	Mariner	$ 72,132.52	24.52%
Toyota	RAV4	$ 73,180.40	23.19%
Saturn	Vue	$ 76,585.69	25.75%
Chevrolet	Equinox	$ 92,872.86	26.98%
Honda	Element	$ 72,035.22	28.08%
Pontiac	Aztek	$ 56,129.19	21.67%
Honda	CR-V	$ 60,558.61	26.27%
	Ttl Entry Level Sportwagons	**$ 80,993.05**	**26.11%**
Nissan	Titan	$ 108,368.33	23.83%
Toyota	Tundra	$ 140,123.74	29.24%
Dodge	Ram pickup	$ 158,540.02	27.63%
Chevrolet	Silverado	$ 162,086.81	27.68%
GMC	Sierra	$ 165,809.00	29.17%
Ford	F Series	$ 161,349.28	25.17%
	Ttl Full Size Pickup	**$ 149,380**	**27.12%**
GMC	Savana/G Van	$ 200,013.85	27.32%
Ford	Econoline/Club Wagon	$ 199,960.21	28.85%
GMC	Express/G Van	$ 159,137.56	25.34%
Dodge	Sprinter Van	$ 236,052.45	25.60%
Dodge	Ram Van	$ 134,673.81	26.17%
Ford	Econoline van	$ 156,100.51	25.31%
	Full Size Van	**$ 180,990**	**26.43%**
Honda	Accord Hybrid	$ 131,368.13	34.08%
Toyota	Prius	$ 147,391.88	41.62%
Honda	Civic Hybrid	$ 137,233.07	37.51%
Ford	Escape Hybrid	$ 136,559.70	30.47%
Mercury	Mariner Hybrid	$ 133,610.40	30.62%
Honda	Insight	$ 113,874.89	35.55%
Lexus	RX 400h	$ 219,857.09	28.97%
Toyota	Highlander Hybrid	$ 114,961.03	29.93%
	Ttl Hybrids	**$ 141,857**	**33.59%**
Volkswagen	Phaeton	$ 609,083.32	22.54%
Audi	allroad quattro	$ 277,247.91	24.53%
Audi	A6	$ 239,298.77	25.51%
Lexus	LS 430	$ 279,940.47	26.52%
Lexus	GS 430	$ 178,241.83	22.30%
Infiniti	Q45	$ 240,839.72	28.24%
Jaguar	S-Type	$ 180,756.56	27.46%
Infiniti	M45	$ 137,820.81	28.22%
Lexus	GS 300	$ 125,344.93	24.78%
Cadillac	DTS	$ 144,101.73	21.85%
Cadillac	DeVille	$ 162,508.86	23.65%

M-Benz	E class	$ 233,626.14	27.55%
Cadillac	Seville	$ 115,555.91	21.58%
Volvo	80 series	$ 149,485.68	22.42%
Cadillac	STS	$ 190,657.87	27.80%
BMW	5 Series	$ 152,603.13	23.48%
Acura	RL	$ 111,612.82	24.64%
Lincoln	Town Car	$ 173,730.45	28.78%
BMW	M3	$ 83,449.85	21.40%
	Total Luxury Car	**$ 199,258.25**	**24.91%**
Volkswagen	Golf	$ 100,101.28	24.58%
Volkswagen	Golf GTI	$ 90,858.07	22.84%
Saturn	L series	$ 111,406.69	26.81%
Honda	Civic	$ 123,937.70	28.77%
Chevrolet	HHR	$ 101,151.72	24.97%
Pontiac	G6	$ 104,494.24	28.06%
Chevrolet	Classic	$ 135,198.64	26.02%
Subaru	Impreza	$ 87,467.15	28.70%
Pontiac	Grand Am	$ 111,879.16	26.20%
Ford	Fusion	$ 111,626.02	26.40%
Mercury	Milan	$ 108,258.61	26.01%
Dodge	Stratus	$ 116,401.96	26.75%
Kia	Optima	$ 87,860.41	27.37%
Hyundai	Sonata	$ 84,546.40	26.36%
Suzuki	Verona	$ 65,040.54	22.43%
Volkswagen	Beetle	$ 68,392.06	21.88%
Pontiac	Vibe	$ 43,444.71	26.68%
Chevrolet	Malibu	$ 73,100.47	23.37%
Chrysler	PT Cruiser	$ 73,907.98	23.88%
Chrysler	Sebring	$ 55,710.76	26.47%
	Ttl Lower Mid-Range Cars	**$ 92,739.23**	**25.73%**
Nissan	Pathfinder	$ 93,202.56	26.57%
Toyota	4Runner	$ 104,461.16	27.06%
Mitsubishi	Montero	$ 93,192.74	27.27%
Mitsubishi	Montero Sport	$ 83,724.61	27.77%
Isuzu	Axiom	$ 62,723.08	25.46%
Land Rover	Freelander	$ 70,568.94	26.68%
Isuzu	Ascender	$ 65,861.30	26.72%
Jeep	Commander	$ 93,861.86	29.48%
Jeep	Grand Cherokee	$ 79,514.31	25.45%
Jeep	Grand Cherokee SRT-8	$ 68,969.73	22.32%
Dodge	Durango	$ 62,878.07	23.92%
Ford	Explorer	$ 81,689.54	28.67%
Chevrolet	TrailBlazer	$ 72,570.07	28.47%
	Ttl Lower Mid-Range SUV	**$ 79,478.31**	**26.60%**
Toyota	Sequoia	$ 167,219.39	26.02%
Nissan	Armada	$ 136,528.35	24.43%
Ford	Excursion	$ 236,587.90	26.62%

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Chevrolet	Suburban	$ 197,232.17	23.14%
GMC	Yukon XL	$ 207,703.88	24.47%
Ford	Expedition	$ 211,144.03	24.31%
Chevrolet	Tahoe	$ 229,052.85	29.10%
GMC	Yukon	$ 197,842.07	25.43%
	Total Large SUV	**$ 197,914**	**25.44%**
Chrysler	Pacifica	$ 139,494.17	27.42%
Nissan	Murano	$ 99,040.79	22.17%
Toyota	Highlander	$ 86,064.93	22.16%
Ford	Freestyle/Windstar	$ 124,820.71	24.42%
Buick	Rendezvous	$ 109,554.12	27.26%
Honda	Pilot	$ 100,983.06	29.46%
Mitsubishi	Endeavor	$ 64,812.96	21.46%
	Total Mid-Range Sportwagons	**$ 103,538.68**	**24.91%**
Volkswagen	EuroVan/T4	$ 98,445.27	26.99%
Honda	Odyssey	$ 121,904.82	28.01%
Pontiac	Montana SV6	$ 95,680.74	25.74%
Chrysler	Town & Country	$ 98,278.49	25.91%
Buick	Terraza	$ 104,152.45	26.31%
Dodge	Caravan/Grand Caravan	$ 88,199.44	24.66%
Toyota	Sienna	$ 96,586.71	28.04%
Chevrolet	Venture	$ 83,697.69	22.57%
Saturn	Relay	$ 85,856.95	24.73%
Pontiac	Montana	$ 100,962.62	28.39%
Nissan	Quest	$ 93,182.80	27.50%
Chevrolet	Uplander	$ 92,351.55	27.96%
Ford	Freestar	$ 89,793.40	26.96%
Mercury	Monterey	$ 79,731.22	24.24%
Kia	Sedona	$ 69,888.44	25.40%
Mazda	MPV	$ 68,415.06	22.46%
GMC	Safari	$ 83,342.58	23.92%
Chevrolet	Astro	$ 82,022.77	23.20%
	Total Minivans	**$ 90,694.06**	**25.72%**
Volvo	70 series	$ 119,855.45	26.10%
Volvo	60 series	$ 96,247.41	26.35%
Mercury	Zephyr	$ 99,442.86	25.30%
Acura	TL	$ 81,615.69	22.49%
Acura	CL	$ 100,566.98	27.33%
Lincoln	LS	$ 72,596.18	23.07%
Jaguar	X-Type	$ 93,984.26	29.14%
Lexus	ES 330	$ 86,834.78	27.26%
Lexus	IS 300	$ 74,052.27	24.94%
Infiniti	G35	$ 83,814.10	27.42%
M-Benz	C class	$ 86,362.38	29.72%
Cadillac	CTS	$ 65,550.59	24.38%
BMW	330	$ 66,882.06	23.51%
Buick	Park Avenue	$ 66,215.95	23.77%

BMW	325	$ 77,505.56	29.61%
Saab	9-5	$ 64,139.78	25.89%
	Total Near Luxury Cars	**$ 83,479.14**	**26.02%**
Audi	A8	$ 267,287.41	25.16%
M-Benz	S class	$ 228,381.10	24.80%
Maserati	Maserati	$ 111,290.19	22.49%
BMW	7 Series	$ 136,843.20	23.19%
Jaguar	XJ	$ 111,478.58	24.71%
	Total Premium Cars	**$ 171,056.10**	**24.07%**
Mercury	Montego	$ 89,250.03	25.94%
Buick	LaCrosse	$ 96,566.45	26.07%
Volkswagen	Passat	$ 107,519.10	27.29%
Dodge	Magnum	$ 79,036.19	21.39%
Ford	Five Hundred	$ 101,394.15	29.21%
Dodge	Charger	$ 96,276.74	28.36%
Nissan	Maxima	$ 106,601.80	28.10%
Chrysler	300/300M	$ 89,366.98	23.73%
Mitsubishi	Diamante	$ 81,714.24	28.01%
Volvo	40 series	$ 88,091.18	28.67%
Infiniti	I30/I35	$ 102,504.32	29.46%
Mazda	Millenia	$ 66,877.41	27.29%
Audi	A4/S4	$ 88,500.11	29.52%
Audi	S4	$ 91,313.00	28.19%
Acura	TSX	$ 64,518.50	22.13%
Saab	9-3	$ 78,607.37	26.40%
Saab	9-2	$ 72,239.79	27.21%
Buick	Regal	$ 43,582.88	24.58%
	Total Premium Mid-Range Cars	**$ 85,775.57**	**26.75%**
M-Benz	SLK class	$ 183,336.72	28.96%
M-Benz	CLS class	$ 206,791.30	23.79%
M-Benz	CLK class	$ 177,465.60	26.61%
Porsche	Boxster	$ 122,227.66	24.15%
Chevrolet	Corvette	$ 120,538.00	23.56%
Audi	TT	$ 90,747.63	23.25%
BMW	Z8	$ 123,405.80	25.51%
BMW	Z4	$ 92,600.25	25.37%
Ford	Thunderbird	$ 74,216.13	29.39%
Chrysler	Crossfire	$ 38,963.64	22.48%
	Total Premium Sporty Cars	**$ 123,029.27**	**25.31%**
Porsche	Cayenne	$ 214,527.72	26.81%
Volkswagen	Touareg	$ 168,700.91	21.94%
Land Rover	Range Rover	$ 168,457.10	21.66%
M-Benz	G class	$ 238,761.26	27.15%
Hummer	H1	$ 289,851.26	21.82%
Lexus	LX 470	$ 168,578.59	24.51%
Cadillac	Escalade ESV	$ 213,710.79	28.57%

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Toyota	Land Cruiser	$ 236,332.04	24.66%
Hummer	H2	$ 159,673.53	26.78%
Cadillac	Escalade	$ 170,987.67	25.99%
Lincoln	Navigator	$ 134,279.02	25.53%
	Total Premium SUV	**$ 196,714.54**	**25.04%**
Volvo	XC90	$ 216,977.17	28.50%
Lexus	RX330	$ 163,646.45	25.78%
Infiniti	FX35	$ 135,052.89	25.77%
Infiniti	FX45	$ 131,190.66	22.67%
M-Benz	R class	$ 131,860.75	27.16%
Volvo	50 series	$ 103,181.28	22.52%
Acura	MDX	$ 133,145.61	24.00%
Cadillac	SRX	$ 135,838.53	28.55%
M-Benz	M class	$ 132,901.20	24.91%
BMW	X5	$ 106,246.36	27.03%
BMW	X3	$ 89,619.16	23.70%
	Total Premium Sportwagons	**$ 134,514.55**	**25.51%**
Honda	Accord	$ 125,379.95	27.52%
Volkswagen	Jetta wagon	$ 82,174.07	29.53%
Volkswagen	Jetta	$ 63,199.68	23.75%
Toyota	Camry	$ 89,442.36	23.12%
Subaru	Baja	$ 78,142.46	26.07%
Subaru	Legacy	$ 67,613.04	23.44%
Subaru	Forester	$ 68,825.43	22.85%
Subaru	Outback	$ 64,035.60	22.71%
Mazda	Mazda6	$ 67,395.04	23.16%
Dodge	Intrepid	$ 79,526.67	25.21%
Chevrolet	Monte Carlo	$ 63,794.38	22.41%
Mitsubishi	Galant	$ 57,917.28	25.84%
Pontiac	Grand Prix	$ 53,955.20	22.88%
Buick	Century	$ 66,578.78	26.30%
Mercury	Sable	$ 69,875.16	24.02%
Ford	Taurus	$ 88,219.52	29.61%
Mazda	626	$ 70,075.70	29.34%
Nissan	Altima	$ 51,206.08	24.23%
Chevrolet	Impala	$ 50,811.35	21.52%
Hyundai	XG350	$ 51,120.83	26.34%
Kia	Amanti	$ 56,531.21	27.63%
	Total Small Rid-Range Cars	**$ 69,800.94**	**25.12%**
Chevrolet	SSR	$ 98,745.54	28.28%
Honda	Ridgeline	$ 72,106.84	24.48%
GMC	Canyon	$ 59,737.87	24.76%
GMC	Sonoma	$ 54,596.43	22.75%
Nissan	Frontier	$ 48,752.21	24.58%
Toyota	Tacoma	$ 53,769.23	27.10%
Chevrolet	Colorado	$ 58,114.89	28.08%
Mitsubishi	Raider	$ 43,010.17	21.86%

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Mazda	B-Series	$ 45,365.88	21.60%
Dodge	Dakota	$ 49,838.90	28.58%
Ford	Ranger	$ 48,303.08	26.53%
Chevrolet	S10	$ 33,855.41	25.26%
	Total Small Pickup	**$ 55,516.37**	**25.32%**
Cadillac	Escalade EXT	$ 117,035.52	25.86%
Chevrolet	Avalanche	$ 135,827.44	29.34%
Lincoln	Mark LT	$ 107,581.81	28.83%
	Total Specialty Utility Pickup	**$ 120,148.26**	**28.01%**
Mazda	RX8	$ 94,884.02	27.50%
Nissan	350Z	$ 96,732.53	28.28%
Audi	A3	$ 71,181.90	24.43%
Mitsubishi	Eclipse Spyder	$ 67,615.13	27.33%
Mitsubishi	Eclipse	$ 74,662.04	25.66%
Pontiac	GTO	$ 85,062.33	29.21%
Toyota	Celica	$ 59,131.75	21.61%
Mini	Mini Cooper S	$ 82,620.81	26.90%
Acura	RSX	$ 81,260.81	26.79%
Pontiac	Solstice	$ 61,734.68	21.46%
Mini	Mini Cooper	$ 65,808.68	21.69%
Ford	Mustang	$ 89,890.67	28.25%
Toyota	MR2 Spyder	$ 70,600.57	25.90%
Mazda	MX-5 Miata	$ 61,291.65	22.90%
Honda	S2000	$ 56,283.38	23.88%
Hyundai	Tiburon	$ 70,466.08	25.51%
Pontiac	Firebird	$ 59,871.78	26.89%
Chevrolet	Camaro	$ 63,027.95	27.39%
	Total Touring	**$ 72,895.93**	**25.64%**
Toyota	Avalon	$ 109,773.08	27.76%
Buick	Lucerne	$ 74,695.97	23.42%
Pontiac	Bonneville	$ 79,441.50	24.36%
Chrysler	Concorde	$ 83,223.34	29.70%
Mercury	Grand Marquis	$ 72,873.91	24.83%
Ford	Crown Victoria	$ 71,518.67	23.81%
Buick	LeSabre	$ 56,022.54	22.31%
	Total Traditional Car	**$ 78,221.29**	**25.17%**
Maybach	Maybach	$ 878,997.36	29.53%
Rolls-Royce	Rolls-Royce	$ 645,485.71	22.18%
Bentley	Bentley	$ 829,829.53	29.01%
Porsche	Carrera GT	$ 250,200.11	29.71%
Lamborghini	Lamborghini	$ 103,749.19	21.39%
Ferrar	Ferrari	$ 131,634.35	27.92%
Ford	GT	$ 121,543.60	27.21%
Aston Martin	Aston Martin	$ 102,978.95	21.80%
	Total Ultra Luxury	**$ 383,052**	**26.09%**

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Lexus	GX 470	$ 102,517.99	21.56%
Land Rover	Discovery	$ 152,078.27	29.67%
Land Rover	LR3	$ 149,323.23	27.02%
Infiniti	QX4	$ 90,095.91	24.03%
Land Rover	Range Rover Sport	$ 119,664.71	24.00%
Lincoln	Aviator	$ 102,566.65	22.88%
Mercury	Mountaineer	$ 109,118.78	27.32%
Subaru	B9 Tribeca	$ 84,074.91	25.53%
GMC	Envoy	$ 100,499.24	22.66%
Buick	Rainier	$ 84,136.55	21.93%
Saab	9-7X	$ 81,412.82	26.25%
Hummer	H3	$ 86,799.64	21.51%
	Total Upper Mid-Range SUV	**$ 105,190.72**	**24.53%**
Acura	NSX	$ 227,571.07	26.62%
M-Benz	SC 430	$ 147,274.86	26.20%
Cadillac	XLR	$ 114,713.12	21.35%
Jaguar	XK	$ 148,223.23	25.78%
Porsche	911 Carrera 4	$ 92,995.75	21.76%
Porsche	911 Carrera	$ 114,986.17	25.61%
M-Benz	SL Coupe/Roadster	$ 104,357.67	22.99%
M-Benz	CL class	$ 133,980.68	28.14%
BMW	6 Series	$ 98,518.84	25.12%
Lotus	Lotus	$ 70,113.20	25.56%
Dodge	Viper	$ 66,123.92	25.75%
	Total Upper Premium Sportscars	**$ 119,896.23**	**24.99%**
	Industry Straight Average	**$ 119,321.12**	**27.90%**

CHAPTER 12 – Non-Recyclables

About half of all new vehicles have components which cannot be recycled into secondary materials and/or cannot be put back into the marketplace as replacement or repair parts. Such material includes leather seats, fluids, worn out drive train components, brake lining, hoses, lighting system, electronics, worn trim panels, etc.

Over the past 20 years, the actual percentage of parts that are not recyclable in modern vehicles has increased as vehicles last longer and such parts become less valuable to the aftermarket. At one point in time, when recycling to a secondary market for secondary material manufacture, these bits and pieces were simply stored and reused to keep a vehicle running long past the original life expectancy, covered in the next chapter.

That is no longer the case. As cars become more sophisticated, the ability to recycle or even re-use parts increases in difficulty. This is a similar problem with modern computers and other electronic devices. Once simple to repair (or, at least, cost effective) today's computers, televisions, radios and other such devices are more likely to be "trashed" rather than fixed.

As the following table shows, CNW's research found a wide variance in both the cost and percentage of models containing and the cost of paying for (in an energy-expended sense) those non-recyclables.

It is here that hybrids show their benefit. Most current hybrids have a non-recycle component in the 40 percent range, significantly less than virtually all other models except for the Jeep Wrangler. While this is contrary to the general rule that complexity results in fewer non-recycle components, hybrids are finding a ready market for components to feed the repair and secondary hybrid marketplaces.

The data is based on the **lifetime energy cost** of those non-recyclable parts from simply scrapping the components to warehousing while waiting for market conditions to favor future disposal, to purchase of those non-recyclable parts for evaluation of potential recyclability.

As the second table below shows, sorted by order of share that is not recyclable, the energy cost can be staggering. The more luxurious vehicles, for example, can have costs that are nearly 10 times their original transaction price. For many of these components these are waste parts and material that can only be disposed of in landfills. CNW has estimated the landfill cost to governments and society in its calculations. To do otherwise would be ignoring the reality. One could argue the amount of energy demanded, but none of the automakers, Toyota included, will address the issue in a way that puts the impact of such non-recyclables on the impact to society in general.

This is not meant as a complaint or “attack” on automakers. Granting that CNW’s assessment is – as mentioned previously – possibly “off” by as much as 15 percent, it is currently the only available assessment based on hard numbers.

Dust to Dust Energy Report -- Automotive

Division	Model	Non-Recycleables Disposal		Non-Recycleables Disposal
Kia	Rio	$	88,006.28	56.35%
Hyundai	Accent	$	64,823.95	50.37%
Chevrolet	Aveo	$	56,300.75	51.84%
Toyota	Echo	$	57,584.46	52.18%
	Total Budget Cars	**$**	**66,678.86**	**52.69%**
Chevrolet	Cobalt	$	93,631.98	54.69%
Toyota	Matrix **	$	91,583.91	55.90%
Mazda	Mazda3	$	86,759.69	54.00%
Nissan	Sentra	$	79,210.85	50.19%
Suzuki	Aerio	$	72,707.21	51.48%
Mitsubishi	Lancer	$	63,651.41	47.37%
Kia	Spectra	$	75,299.97	55.15%
Scion	tC	$	63,430.27	54.03%
Suzuki	Forenza	$	60,612.77	50.48%
Ford	Focus	$	73,376.40	54.08%
Mazda	Protégé	$	61,436.66	49.41%
Pontiac	Sunfire	$	62,078.46	52.19%
Chevrolet	Cavalier	$	60,291.65	52.37%
Scion	xA	$	63,912.49	55.70%
Toyota	Corolla	$	67,081.71	54.22%
Dodge	Neon	$	53,701.94	49.85%
Hyundai	Elantra	$	58,909.42	50.28%
Saturn	Ion	$	58,327.35	51.11%
Ford	Escort	$	56,519.96	51.81%
Scion	xB	$	37,076.78	41.05%
	Total Economy Cars	**$**	**66,980.04**	**51.77%**
Nissan	Xterra	$	231,086.00	59.85%
Isuzu	Trooper	$	221,570.22	55.54%
Mazda	Mazda5	$	175,085.09	60.97%
Isuzu	Rodeo	$	147,257.53	51.92%
Suzuki	XL-7	$	131,340.66	53.89%
Suzuki	Grand Vitara	$	142,227.32	58.82%
Kia	Sorento	$	98,009.71	51.94%
Chevrolet	Blazer	$	131,060.23	48.41%
Suzuki	Vitara	$	98,694.24	49.70%
Isuzu	Rodeo Sport	$	102,725.16	51.77%
Kia	Sportage	$	94,303.42	50.76%
Jeep	Liberty	$	113,666.00	54.71%
Chevrolet	Tracker	$	44,840.84	42.23%
Jeep	Wrangler	$	43,742.45	34.99%
	Ttl Entry Level SUVs	**$**	**126,829.20**	**51.82%**

Dust to Dust Energy Report -- Automotive

Mitsubishi	Outlander	$	236,366.77	56.99%
Hyundai	Tucson	$	181,836.04	56.22%
Mazda	Tribute	$	195,653.49	57.82%
Hyundai	Santa Fe	$	171,810.62	56.35%
Pontiac	Torrent	$	191,294.84	59.82%
Ford	Escape	$	181,284.41	57.73%
Mercury	Mariner	$	176,497.55	60.00%
Toyota	RAV4	$	193,882.96	61.44%
Saturn	Vue	$	176,502.68	59.34%
Chevrolet	Equinox	$	199,864.09	58.06%
Honda	Element	$	143,682.51	56.01%
Pontiac	Aztek	$	155,793.43	60.15%
Honda	CR-V	$	129,552.89	56.20%
	Ttl Entry Level Sportwagons	**$**	**179,540.17**	**58.16%**
Nissan	Titan	$	272,588.03	59.94%
Toyota	Tundra	$	264,359.91	55.16%
Dodge	Ram pickup	$	333,714.26	58.16%
Chevrolet	Silverado	$	338,826.11	57.86%
GMC	Sierra	$	320,285.88	56.35%
Ford	F Series	$	374,860.70	58.48%
	Ttl Full Size Pickup	**$**	**317,439.15**	**57.66%**
GMC	Savana/G Van	$	420,627.53	57.45%
Ford	Econoline/Club Wagon	$	388,843.36	56.10%
GMC	Express/G Van	$	373,624.46	59.49%
Dodge	Sprinter Van	$	557,495.01	60.46%
Dodge	Ram Van	$	288,671.93	56.10%
Ford	Econoline van	$	356,524.53	57.81%
	Full Size Van	**$**	**397,631.14**	**57.90%**
Honda	Accord Hybrid	$	188,079.70	48.79%
Toyota	Prius	$	131,082.41	37.01%
Honda	Civic Hybrid	$	165,330.78	45.19%
Ford	Escape Hybrid	$	254,789.73	52.68%
Mercury	Mariner Hybrid	$	245,825.33	52.73%
Honda	Insight	$	137,902.90	43.05%
Lexus	RX 400h	$	426,233.70	42.36%
Toyota	Highlander Hybrid	$	201,044.29	49.21%
	Ttl Hybrids	**$**	**218,786.11**	**46.38%**
Volkswagen	Phaeton	$	1,859,453.79	68.81%
Audi	allroad quattro	$	735,893.52	65.11%
Audi	A6	$	603,082.94	64.29%
Lexus	LS 430	$	669,156.00	63.39%
Lexus	GS 430	$	534,445.03	66.86%
Infiniti	Q45	$	517,181.51	60.64%
Jaguar	S-Type	$	397,594.57	60.40%
Infiniti	M45	$	288,018.77	58.97%

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Lexus	GS 300	$	315,319.96	62.34%
Cadillac	DTS	$	440,051.27	66.72%
Cadillac	DeVille	$	439,682.13	63.99%
M-Benz	E class	$	511,056.73	60.27%
Cadillac	Seville	$	343,921.81	64.23%
Volvo	80 series	$	435,356.86	65.30%
Cadillac	STS	$	412,980.91	60.22%
BMW	5 Series	$	422,983.89	65.08%
Acura	RL	$	279,385.53	61.68%
Lincoln	Town Car	$	348,093.25	57.66%
BMW	M3	$	246,361.93	63.18%
	Total Luxury Car	**$**	**515,790.55**	**63.11%**
Volkswagen	Golf	$	262,463.86	64.45%
Volkswagen	Golf GTI	$	255,508.33	64.23%
Saturn	L series	$	249,962.31	60.15%
Honda	Civic	$	254,022.93	58.97%
Chevrolet	HHR	$	240,442.11	59.35%
Pontiac	G6	$	218,466.26	58.67%
Chevrolet	Classic	$	323,640.38	62.29%
Subaru	Impreza	$	170,182.11	55.84%
Pontiac	Grand Am	$	256,950.50	60.17%
Ford	Fusion	$	256,529.95	60.67%
Mercury	Milan	$	255,007.74	61.27%
Dodge	Stratus	$	262,624.51	60.35%
Kia	Optima	$	190,649.52	59.39%
Hyundai	Sonata	$	192,176.67	59.92%
Suzuki	Verona	$	180,390.42	62.21%
Volkswagen	Beetle	$	198,754.79	63.59%
Pontiac	Vibe	$	89,557.97	55.00%
Chevrolet	Malibu	$	197,624.24	63.18%
Chrysler	PT Cruiser	$	186,990.94	60.42%
Chrysler	Sebring	$	116,299.68	55.26%
	Ttl Lower Mid-Range Cars	**$**	**217,912.26**	**60.27%**
Nissan	Pathfinder	$	201,572.62	57.46%
Toyota	4Runner	$	218,985.22	56.73%
Mitsubishi	Montero	$	189,567.20	55.47%
Mitsubishi	Montero Sport	$	165,275.73	54.82%
Isuzu	Axiom	$	136,729.05	55.50%
Land Rover	Freelander	$	144,129.02	54.49%
Isuzu	Ascender	$	128,392.52	52.09%
Jeep	Commander	$	161,525.69	50.73%
Jeep	Grand Cherokee	$	168,783.36	54.02%
Jeep	Grand Cherokee SRT-8	$	176,276.27	51.18%
Dodge	Durango	$	142,465.97	54.20%
Ford	Explorer	$	142,374.80	49.97%
Chevrolet	TrailBlazer	$	129,268.38	50.71%
	Ttl Lower Mid-Range SUV	**$**	**161,949.68**	**53.64%**

Toyota	Sequoia	$	391,186.95	60.87%
Nissan	Armada	$	338,741.17	60.61%
Ford	Excursion	$	528,494.04	59.46%
Chevrolet	Suburban	$	546,367.64	64.10%
GMC	Yukon XL	$	529,349.07	62.36%
Ford	Expedition	$	538,240.55	61.97%
Chevrolet	Tahoe	$	457,854.33	58.17%
GMC	Yukon	$	479,887.97	61.68%
	Total Large SUV	**$**	**476,265.21**	**61.15%**
Chrysler	Pacifica	$	304,232.31	59.80%
Nissan	Murano	$	289,027.33	64.70%
Toyota	Highlander	$	250,759.72	64.57%
Ford	Freestyle/Windstar	$	313,200.14	61.27%
Buick	Rendezvous	$	241,686.68	60.14%
Honda	Pilot	$	190,765.10	55.65%
Mitsubishi	Endeavor	$	191,311.46	63.34%
	Total Mid-Range Sportwagons	**$**	**254,426.10**	**61.35%**
Volkswagen	EuroVan/T4	$	212,474.96	58.25%
Honda	Odyssey	$	253,813.49	58.32%
Pontiac	Montana SV6	$	220,301.41	59.27%
Chrysler	Town & Country	$	226,759.08	59.78%
Buick	Terraza	$	231,774.29	58.55%
Dodge	Caravan/Grand Caravan	$	216,312.90	60.48%
Toyota	Sienna	$	199,032.18	57.78%
Chevrolet	Venture	$	227,014.51	61.22%
Saturn	Relay	$	209,418.28	60.32%
Pontiac	Montana	$	204,310.56	57.45%
Nissan	Quest	$	198,387.01	58.55%
Chevrolet	Uplander	$	182,295.78	55.19%
Ford	Freestar	$	188,687.91	56.65%
Mercury	Monterey	$	197,578.05	60.07%
Kia	Sedona	$	157,318.85	57.18%
Mazda	MPV	$	187,954.06	61.70%
GMC	Safari	$	204,794.33	58.78%
Chevrolet	Astro	$	208,911.12	59.09%
	Total Minivans	**$**	**207,063.27**	**58.81%**
Volvo	70 series	$	272,988.41	59.45%
Volvo	60 series	$	213,269.64	58.39%
Mercury	Zephyr	$	239,295.55	60.88%
Acura	TL	$	232,792.52	64.15%
Acura	CL	$	219,397.25	59.62%
Lincoln	LS	$	194,874.46	61.93%
Jaguar	X-Type	$	180,523.20	55.97%
Lexus	ES 330	$	181,579.53	57.00%
Lexus	IS 300	$	179,714.82	60.53%
Infiniti	G35	$	175,934.76	57.56%
M-Benz	C class	$	158,056.11	54.39%

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Cadillac	CTS	$	159,746.64	59.41%
BMW	330	$	169,302.89	59.51%
Buick	Park Avenue	$	166,073.53	59.62%
BMW	325	$	137,934.98	52.70%
Saab	9-5	$	141,926.05	57.29%
	Total Near Luxury Cars	**$**	**188,963.14**	**58.65%**
Audi	A8	$	685,915.27	64.57%
M-Benz	S class	$	582,337.42	63.24%
Maserati	Maserati	$	302,813.72	61.19%
BMW	7 Series	$	380,851.16	64.54%
Jaguar	XJ	$	282,713.53	62.67%
	Total Premium Cars	**$**	**446,926.22**	**63.24%**
Mercury	Montego	$	205,277.36	59.66%
Buick	LaCrosse	$	223,400.19	60.31%
Volkswagen	Passat	$	235,017.49	59.65%
Dodge	Magnum	$	237,075.85	64.16%
Ford	Five Hundred	$	196,243.61	56.53%
Dodge	Charger	$	193,573.96	57.02%
Nissan	Maxima	$	221,743.55	58.45%
Chrysler	300/300M	$	227,609.01	60.44%
Mitsubishi	Diamante	$	165,373.32	56.69%
Volvo	40 series	$	174,533.67	56.80%
Infiniti	I30/I35	$	197,282.81	56.70%
Mazda	Millenia	$	138,450.26	56.50%
Audi	A4/S4	$	159,093.25	53.07%
Audi	S4	$	201,804.24	53.67%
Acura	TSX	$	185,107.74	63.49%
Saab	9-3	$	172,031.96	57.78%
Saab	9-2	$	148,327.62	55.87%
Buick	Regal	$	98,306.05	55.44%
	Total Premium Mid-Range Cars	**$**	**187,791.77**	**57.90%**
M-Benz	SLK class	$	375,621.76	59.33%
M-Benz	CLS class	$	570,882.60	65.68%
M-Benz	CLK class	$	410,665.99	61.58%
Porsche	Boxster	$	321,002.56	63.42%
Chevrolet	Corvette	$	331,487.99	64.79%
Audi	TT	$	250,216.62	64.11%
BMW	Z8	$	296,297.43	61.25%
BMW	Z4	$	223,975.13	61.36%
Ford	Thunderbird	$	131,697.55	52.15%
Chrysler	Crossfire	$	96,431.16	55.64%
	Total Premium Sporty Cars	**$**	**300,827.88**	**60.93%**
Porsche	Cayenne	$	500,469.13	62.54%
Volkswagen	Touareg	$	511,067.51	66.47%
Land Rover	Range Rover	$	504,454.43	64.86%
M-Benz	G class	$	521,215.93	59.27%

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Hummer	H1	$	873,659.90	65.77%
Lexus	LX 470	$	423,706.16	61.60%
Cadillac	Escalade ESV	$	438,965.38	58.68%
Toyota	Land Cruiser	$	592,265.21	61.80%
Hummer	H2	$	356,751.50	59.83%
Cadillac	Escalade	$	397,021.21	60.35%
Lincoln	Navigator	$	305,759.53	58.13%
	Total Premium SUV	**$**	**493,212.35**	**61.76%**
Volvo	XC90	$	459,612.23	60.37%
Lexus	RX330	$	395,425.34	62.29%
Infiniti	FX35	$	315,737.05	60.25%
Infiniti	FX45	$	366,723.15	63.37%
M-Benz	R class	$	287,615.76	59.24%
Volvo	50 series	$	300,203.28	65.52%
Acura	MDX	$	353,605.05	63.74%
Cadillac	SRX	$	272,388.88	57.25%
M-Benz	M class	$	320,838.13	60.14%
BMW	X5	$	225,701.68	57.42%
BMW	X3	$	233,502.58	61.75%
	Total Premium Sportwagons	**$**	**321,032.10**	**61.03%**
Honda	Accord	$	272,088.18	59.72%
Volkswagen	Jetta wagon	$	155,067.37	55.72%
Volkswagen	Jetta	$	166,175.87	62.45%
Toyota	Camry	$	247,139.29	63.88%
Subaru	Baja	$	177,161.19	59.10%
Subaru	Legacy	$	179,288.58	62.16%
Subaru	Forester	$	184,929.20	61.40%
Subaru	Outback	$	179,806.34	55.67%
Mazda	Mazda6	$	181,460.08	62.36%
Dodge	Intrepid	$	181,981.91	57.69%
Chevrolet	Monte Carlo	$	173,448.55	60.93%
Mitsubishi	Galant	$	129,472.93	57.76%
Pontiac	Grand Prix	$	139,928.05	59.34%
Buick	Century	$	143,482.68	56.68%
Mercury	Sable	$	173,808.75	59.75%
Ford	Taurus	$	159,702.03	53.60%
Mazda	626	$	124,320.20	52.05%
Nissan	Altima	$	125,116.75	59.20%
Chevrolet	Impala	$	143,385.91	60.73%
Hyundai	XG350	$	107,394.27	55.33%
Kia	Amanti	$	107,133.08	52.36%
	Total Small Rid-Range Cars	**$**	**164,394.82**	**58.47%**
Chevrolet	SSR	$	187,982.13	53.84%
Honda	Ridgeline	$	167,718.12	56.94%
GMC	Canyon	$	131,715.27	54.59%
GMC	Sonoma	$	136,412.89	56.84%
Nissan	Frontier	$	104,497.17	52.69%

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Toyota	Tacoma	$	105,053.54	52.95%
Chevrolet	Colorado	$	101,244.20	48.92%
Mitsubishi	Raider	$	106,227.69	53.99%
Mazda	B-Series	$	107,708.77	51.28%
Dodge	Dakota	$	78,727.85	45.15%
Ford	Ranger	$	88,484.58	48.60%
Chevrolet	S10	$	64,630.74	48.22%
	Total Small Pickup	**$**	**115,033.58**	**52.00%**
Cadillac	Escalade EXT	$	254,325.35	56.20%
Chevrolet	Avalanche	$	236,925.24	51.18%
Lincoln	Mark LT	$	196,326.91	52.61%
	Total Specialty Utility Pickup	**$**	**229,192.50**	**53.33%**
Mazda	RX8	$	198,577.09	57.55%
Nissan	350Z	$	196,150.54	57.35%
Audi	A3	$	178,845.78	61.38%
Mitsubishi	Eclipse Spyder	$	143,770.67	58.11%
Mitsubishi	Eclipse	$	172,769.42	59.38%
Pontiac	GTO	$	157,499.82	54.08%
Toyota	Celica	$	175,391.14	64.10%
Mini	Mini Cooper S	$	181,170.63	58.99%
Acura	RSX	$	180,474.13	59.50%
Pontiac	Solstice	$	181,924.95	63.24%
Mini	Mini Cooper	$	195,403.67	64.40%
Ford	Mustang	$	178,928.53	56.23%
Toyota	MR2 Spyder	$	161,599.24	59.28%
Mazda	MX-5 Miata	$	161,937.02	60.50%
Honda	S2000	$	134,827.36	57.20%
Hyundai	Tiburon	$	161,398.30	58.43%
Pontiac	Firebird	$	116,838.69	52.48%
Chevrolet	Camaro	$	117,467.20	51.05%
	Total Touring	**$**	**166,387.45**	**58.51%**
Toyota	Avalon	$	232,002.54	58.67%
Buick	Lucerne	$	197,871.77	62.04%
Pontiac	Bonneville	$	192,438.06	59.01%
Chrysler	Concorde	$	146,146.71	52.16%
Mercury	Grand Marquis	$	172,230.57	58.68%
Ford	Crown Victoria	$	176,314.92	58.70%
Buick	LeSabre	$	151,874.38	60.48%
	Total Traditional Car	**$**	**181,268.42**	**58.53%**
Maybach	Maybach	$	1,836,964.62	61.71%
Rolls-Royce	Rolls-Royce	$	2,014,316.81	69.22%
Bentley	Bentley	$	1,784,989.36	62.40%
Porsche	Carrera GT	$	477,337.07	56.68%
Lamborghini	Lamborghini	$	298,627.55	61.57%
Ferrar	Ferrari	$	255,810.84	54.26%
Ford	GT	$	257,468.47	57.64%

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Aston Martin	Aston Martin	$	296,417.32	62.75%
	Total Ultra Luxury	**$**	**902,741.51**	**60.78%**
Lexus	GX 470	$	302,120.35	63.54%
Land Rover	Discovery	$	284,862.18	55.58%
Land Rover	LR3	$	318,010.63	57.54%
Infiniti	QX4	$	225,431.90	60.13%
Land Rover	Range Rover Sport	$	299,961.51	60.16%
Lincoln	Aviator	$	269,382.96	60.09%
Mercury	Mountaineer	$	225,108.65	56.36%
Subaru	B9 Tribeca	$	190,937.86	57.98%
GMC	Envoy	$	271,630.56	61.25%
Buick	Rainier	$	243,993.83	63.60%
Saab	9-7X	$	177,512.65	57.24%
Hummer	H3	$	251,444.74	62.31%
	Total Upper Mid-Range SUV	**$**	**255,033.15**	**59.65%**
Acura	NSX	$	534,393.03	62.51%
M-Benz	SC 430	$	345,836.27	61.52%
Cadillac	XLR	$	355,012.94	66.07%
Jaguar	XK	$	354,213.30	61.61%
Porsche	911 Carrera 4	$	268,718.85	62.88%
Porsche	911 Carrera	$	256,711.19	57.18%
M-Benz	SL Coupe/Roadster	$	277,584.04	61.15%
M-Benz	CL class	$	280,496.22	58.91%
BMW	6 Series	$	234,212.69	59.72%
Lotus	Lotus	$	164,672.46	60.03%
Dodge	Viper	$	139,851.79	54.46%
	Total Upper Premium Sportscars	**$**	**291,972.98**	**60.55%**
	Industry Straight Average	**$**	**276,187.59**	**62.41%**

Dust to Dust Energy Report -- Automotive

Sorted by high-to-low non-recyclables disposal costs.

Division	Model	Non-Recycleables Disposal	Non-Recyclеables Disposal
Rolls-Royce	Rolls-Royce	$ 2,014,316.81	69.22%
Volkswagen	Phaeton	$ 1,859,453.79	68.81%
Lexus	GS 430	$ 534,445.03	66.86%
Cadillac	DTS	$ 440,051.27	66.72%
Volkswagen	Touareg	$ 511,067.51	66.47%
Cadillac	XLR	$ 355,012.94	66.07%
Hummer	H1	$ 873,659.90	65.77%
M-Benz	CLS class	$ 570,882.60	65.68%
Volvo	50 series	$ 300,203.28	65.52%
Volvo	80 series	$ 435,356.86	65.30%
Audi	allroad quattro	$ 735,893.52	65.11%
BMW	5 Series	$ 422,983.89	65.08%
Land Rover	Range Rover	$ 504,454.43	64.86%
Chevrolet	Corvette	$ 331,487.99	64.79%
Nissan	Murano	$ 289,027.33	64.70%
Audi	A8	$ 685,915.27	64.57%
Toyota	Highlander	$ 250,759.72	64.57%
BMW	7 Series	$ 380,851.16	64.54%
Volkswagen	Golf	$ 262,463.86	64.45%
Mini	Mini Cooper	$ 195,403.67	64.40%
Audi	A6	$ 603,082.94	64.29%
Volkswagen	Golf GTI	$ 255,508.33	64.23%
Cadillac	Seville	$ 343,921.81	64.23%
Dodge	Magnum	$ 237,075.85	64.16%
Acura	TL	$ 232,792.52	64.15%
Audi	TT	$ 250,216.62	64.11%
Chevrolet	Suburban	$ 546,367.64	64.10%
Toyota	Celica	$ 175,391.14	64.10%
Cadillac	DeVille	$ 439,682.13	63.99%
Toyota	Camry	$ 247,139.29	63.88%
Acura	MDX	$ 353,605.05	63.74%
Buick	Rainier	$ 243,993.83	63.60%
Volkswagen	Beetle	$ 198,754.79	63.59%
Lexus	GX 470	$ 302,120.35	63.54%
Acura	TSX	$ 185,107.74	63.49%
Porsche	Boxster	$ 321,002.56	63.42%
Lexus	LS 430	$ 669,156.00	63.39%
Infiniti	FX45	$ 366,723.15	63.37%
Mitsubishi	Endeavor	$ 191,311.46	63.34%
	Total Premium Cars	**$ 446,926.22**	**63.24%**
Pontiac	Solstice	$ 181,924.95	63.24%
M-Benz	S class	$ 582,337.42	63.24%
Chevrolet	Malibu	$ 197,624.24	63.18%
BMW	M3	$ 246,361.93	63.18%

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	Total Luxury Car	**$**	**515,790.55**	**63.11%**
Porsche	911 Carrera 4	$	268,718.85	62.88%
Aston Martin	Aston Martin	$	296,417.32	62.75%
Jaguar	XJ	$	282,713.53	62.67%
Porsche	Cayenne	$	500,469.13	62.54%
Acura	NSX	$	534,393.03	62.51%
Volkswagen	Jetta	$	166,175.87	62.45%
Bentley	Bentley	$	1,784,989.36	62.40%
GMC	Yukon XL	$	529,349.07	62.36%
Mazda	Mazda6	$	181,460.08	62.36%
Lexus	GS 300	$	315,319.96	62.34%
Hummer	H3	$	251,444.74	62.31%
Lexus	RX330	$	395,425.34	62.29%
Chevrolet	Classic	$	323,640.38	62.29%
Suzuki	Verona	$	180,390.42	62.21%
Subaru	Legacy	$	179,288.58	62.16%
Buick	Lucerne	$	197,871.77	62.04%
Ford	Expedition	$	538,240.55	61.97%
Lincoln	LS	$	194,874.46	61.93%
Toyota	Land Cruiser	$	592,265.21	61.80%
	Total Premium SUV	**$**	**493,212.35**	**61.76%**
BMW	X3	$	233,502.58	61.75%
Maybach	Maybach	$	1,836,964.62	61.71%
Mazda	MPV	$	187,954.06	61.70%
GMC	Yukon	$	479,887.97	61.68%
Acura	RL	$	279,385.53	61.68%
Jaguar	XK	$	354,213.30	61.61%
Lexus	LX 470	$	423,706.16	61.60%
M-Benz	CLK class	$	410,665.99	61.58%
Lamborghini	Lamborghini	$	298,627.55	61.57%
M-Benz	SC 430	$	345,836.27	61.52%
Toyota	RAV4	$	193,882.96	61.44%
Subaru	Forester	$	184,929.20	61.40%
Audi	A3	$	178,845.78	61.38%
BMW	Z4	$	223,975.13	61.36%
	Total Mid-Range Sportwagons	**$**	**254,426.10**	**61.35%**
Ford	Freestyle/Windstar	$	313,200.14	61.27%
Mercury	Milan	$	255,007.74	61.27%
BMW	Z8	$	296,297.43	61.25%
GMC	Envoy	$	271,630.56	61.25%
Chevrolet	Venture	$	227,014.51	61.22%
Maserati	Maserati	$	302,813.72	61.19%
	Total Large SUV	**$**	**476,265.21**	**61.15%**
M-Benz	SL Coupe/Roadster	$	277,584.04	61.15%
	Total Premium Sportwagons	**$**	**321,032.10**	**61.03%**
Mazda	Mazda5	$	175,085.09	60.97%
	Total Premium Sporty Cars	**$**	**300,827.88**	**60.93%**
Chevrolet	Monte Carlo	$	173,448.55	60.93%
Mercury	Zephyr	$	239,295.55	60.88%

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Toyota	Sequoia	$	391,186.95	60.87%
	Total Ultra Luxury	**$**	**902,741.51**	**60.78%**
Chevrolet	Impala	$	143,385.91	60.73%
Ford	Fusion	$	256,529.95	60.67%
Infiniti	Q45	$	517,181.51	60.64%
Nissan	Armada	$	338,741.17	60.61%
	Total Upper Premium Sportscars	**$**	**291,972.98**	**60.55%**
Lexus	IS 300	$	179,714.82	60.53%
Mazda	MX-5 Miata	$	161,937.02	60.50%
Buick	LeSabre	$	151,874.38	60.48%
Dodge	Caravan/Grand Caravan	$	216,312.90	60.48%
Dodge	Sprinter Van	$	557,495.01	60.46%
Chrysler	300/300M	$	227,609.01	60.44%
Chrysler	PT Cruiser	$	186,990.94	60.42%
Jaguar	S-Type	$	397,594.57	60.40%
Volvo	XC90	$	459,612.23	60.37%
Dodge	Stratus	$	262,624.51	60.35%
Cadillac	Escalade	$	397,021.21	60.35%
Saturn	Relay	$	209,418.28	60.32%
Buick	LaCrosse	$	223,400.19	60.31%
	Ttl Lower Mid-Range Cars	**$**	**217,912.26**	**60.27%**
M-Benz	E class	$	511,056.73	60.27%
Infiniti	FX35	$	315,737.05	60.25%
Cadillac	STS	$	412,980.91	60.22%
Pontiac	Grand Am	$	256,950.50	60.17%
Land Rover	Range Rover Sport	$	299,961.51	60.16%
Saturn	L series	$	249,962.31	60.15%
Pontiac	Aztek	$	155,793.43	60.15%
Buick	Rendezvous	$	241,686.68	60.14%
M-Benz	M class	$	320,838.13	60.14%
Infiniti	QX4	$	225,431.90	60.13%
Lincoln	Aviator	$	269,382.96	60.09%
Mercury	Monterey	$	197,578.05	60.07%
Lotus	Lotus	$	164,672.46	60.03%
Mercury	Mariner	$	176,497.55	60.00%
Nissan	Titan	$	272,588.03	59.94%
Hyundai	Sonata	$	192,176.67	59.92%
Nissan	Xterra	$	231,086.00	59.85%
Hummer	H2	$	356,751.50	59.83%
Pontiac	Torrent	$	191,294.84	59.82%
Chrysler	Pacifica	$	304,232.31	59.80%
Chrysler	Town & Country	$	226,759.08	59.78%
Mercury	Sable	$	173,808.75	59.75%
Honda	Accord	$	272,088.18	59.72%
BMW	6 Series	$	234,212.69	59.72%
Mercury	Montego	$	205,277.36	59.66%
Volkswagen	Passat	$	235,017.49	59.65%
	Total Upper Mid-Range SUV	**$**	**255,033.15**	**59.65%**
Acura	CL	$	219,397.25	59.62%
Buick	Park Avenue	$	166,073.53	59.62%

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BMW	330	$	169,302.89	59.51%
Acura	RSX	$	180,474.13	59.50%
GMC	Express/G Van	$	373,624.46	59.49%
Ford	Excursion	$	528,494.04	59.46%
Volvo	70 series	$	272,988.41	59.45%
Cadillac	CTS	$	159,746.64	59.41%
Kia	Optima	$	190,649.52	59.39%
Mitsubishi	Eclipse	$	172,769.42	59.38%
Chevrolet	HHR	$	240,442.11	59.35%
Saturn	Vue	$	176,502.68	59.34%
Pontiac	Grand Prix	$	139,928.05	59.34%
M-Benz	SLK class	$	375,621.76	59.33%
Toyota	MR2 Spyder	$	161,599.24	59.28%
M-Benz	G class	$	521,215.93	59.27%
Pontiac	Montana SV6	$	220,301.41	59.27%
M-Benz	R class	$	287,615.76	59.24%
Nissan	Altima	$	125,116.75	59.20%
Subaru	Baja	$	177,161.19	59.10%
Chevrolet	Astro	$	208,911.12	59.09%
Pontiac	Bonneville	$	192,438.06	59.01%
Mini	Mini Cooper S	$	181,170.63	58.99%
Infiniti	M45	$	288,018.77	58.97%
Honda	Civic	$	254,022.93	58.97%
M-Benz	CL class	$	280,496.22	58.91%
Suzuki	Grand Vitara	$	142,227.32	58.82%
	Total Minivans	**$**	**207,063.27**	**58.81%**
GMC	Safari	$	204,794.33	58.78%
Ford	Crown Victoria	$	176,314.92	58.70%
Mercury	Grand Marquis	$	172,230.57	58.68%
Cadillac	Escalade ESV	$	438,965.38	58.68%
Toyota	Avalon	$	232,002.54	58.67%
Pontiac	G6	$	218,466.26	58.67%
	Total Near Luxury Cars	**$**	**188,963.14**	**58.65%**
Buick	Terraza	$	231,774.29	58.55%
Nissan	Quest	$	198,387.01	58.55%
	Total Traditional Car	**$**	**181,268.42**	**58.53%**
	Total Touring	**$**	**166,387.45**	**58.51%**
Ford	F Series	$	374,860.70	58.48%
	Total Small Rid-Range Cars	**$**	**164,394.82**	**58.47%**
Nissan	Maxima	$	221,743.55	58.45%
Hyundai	Tiburon	$	161,398.30	58.43%
Volvo	60 series	$	213,269.64	58.39%
Honda	Odyssey	$	253,813.49	58.32%
Volkswagen	EuroVan/T4	$	212,474.96	58.25%
Chevrolet	Tahoe	$	457,854.33	58.17%
	Ttl Entry Level Sportwagons	**$**	**179,540.17**	**58.16%**
Dodge	Ram pickup	$	333,714.26	58.16%
Lincoln	Navigator	$	305,759.53	58.13%
Mitsubishi	Eclipse Spyder	$	143,770.67	58.11%
Chevrolet	Equinox	$	199,864.09	58.06%

Subaru	B9 Tribeca	$	190,937.86	57.98%
	Total Premium Mid-Range Cars	**$**	**187,791.77**	**57.90%**
	Full Size Van	**$**	**397,631.14**	**57.90%**
Chevrolet	Silverado	$	338,826.11	57.86%
Mazda	Tribute	$	195,653.49	57.82%
Ford	Econoline van	$	356,524.53	57.81%
Toyota	Sienna	$	199,032.18	57.78%
Saab	9-3	$	172,031.96	57.78%
Mitsubishi	Galant	$	129,472.93	57.76%
Ford	Escape	$	181,284.41	57.73%
Dodge	Intrepid	$	181,981.91	57.69%
Lincoln	Town Car	$	348,093.25	57.66%
	Ttl Full Size Pickup	**$**	**317,439.15**	**57.66%**
Ford	GT	$	257,468.47	57.64%
Infiniti	G35	$	175,934.76	57.56%
Mazda	RX8	$	198,577.09	57.55%
Land Rover	LR3	$	318,010.63	57.54%
Nissan	Pathfinder	$	201,572.62	57.46%
GMC	Savana/G Van	$	420,627.53	57.45%
Pontiac	Montana	$	204,310.56	57.45%
BMW	X5	$	225,701.68	57.42%
Nissan	350Z	$	196,150.54	57.35%
Saab	9-5	$	141,926.05	57.29%
Cadillac	SRX	$	272,388.88	57.25%
Saab	9-7X	$	177,512.65	57.24%
Honda	S2000	$	134,827.36	57.20%
Kia	Sedona	$	157,318.85	57.18%
Porsche	911 Carrera	$	256,711.19	57.18%
Dodge	Charger	$	193,573.96	57.02%
Lexus	ES 330	$	181,579.53	57.00%
Mitsubishi	Outlander	$	236,366.77	56.99%
Honda	Ridgeline	$	167,718.12	56.94%
GMC	Sonoma	$	136,412.89	56.84%
Volvo	40 series	$	174,533.67	56.80%
Toyota	4Runner	$	218,985.22	56.73%
Infiniti	I30/I35	$	197,282.81	56.70%
Mitsubishi	Diamante	$	165,373.32	56.69%
Porsche	Carrera GT	$	477,337.07	56.68%
Buick	Century	$	143,482.68	56.68%
Ford	Freestar	$	188,687.91	56.65%
Ford	Five Hundred	$	196,243.61	56.53%
Mazda	Millenia	$	138,450.26	56.50%
Mercury	Mountaineer	$	225,108.65	56.36%
Hyundai	Santa Fe	$	171,810.62	56.35%
Kia	Rio	$	88,006.28	56.35%
GMC	Sierra	$	320,285.88	56.35%
Ford	Mustang	$	178,928.53	56.23%
Hyundai	Tucson	$	181,836.04	56.22%
Honda	CR-V	$	129,552.89	56.20%
Cadillac	Escalade EXT	$	254,325.35	56.20%

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Ford	Econoline/Club Wagon	$	388,843.36	56.10%
Dodge	Ram Van	$	288,671.93	56.10%
Honda	Element	$	143,682.51	56.01%
Jaguar	X-Type	$	180,523.20	55.97%
Toyota	Matrix **	$	91,583.91	55.90%
Saab	9-2	$	148,327.62	55.87%
Subaru	Impreza	$	170,182.11	55.84%
Volkswagen	Jetta wagon	$	155,067.37	55.72%
Scion	xA	$	63,912.49	55.70%
Subaru	Outback	$	179,806.34	55.67%
Honda	Pilot	$	190,765.10	55.65%
Chrysler	Crossfire	$	96,431.16	55.64%
Land Rover	Discovery	$	284,862.18	55.58%
Isuzu	Trooper	$	221,570.22	55.54%
Isuzu	Axiom	$	136,729.05	55.50%
Mitsubishi	Montero	$	189,567.20	55.47%
Buick	Regal	$	98,306.05	55.44%
Hyundai	XG350	$	107,394.27	55.33%
Chrysler	Sebring	$	116,299.68	55.26%
Chevrolet	Uplander	$	182,295.78	55.19%
Toyota	Tundra	$	264,359.91	55.16%
Kia	Spectra	$	75,299.97	55.15%
Pontiac	Vibe	$	89,557.97	55.00%
Mitsubishi	Montero Sport	$	165,275.73	54.82%
Jeep	Liberty	$	113,666.00	54.71%
Chevrolet	Cobalt	$	93,631.98	54.69%
GMC	Canyon	$	131,715.27	54.59%
Land Rover	Freelander	$	144,129.02	54.49%
Dodge	Viper	$	139,851.79	54.46%
M-Benz	C class	$	158,056.11	54.39%
Ferrar	Ferrari	$	255,810.84	54.26%
Toyota	Corolla	$	67,081.71	54.22%
Dodge	Durango	$	142,465.97	54.20%
Pontiac	GTO	$	157,499.82	54.08%
Ford	Focus	$	73,376.40	54.08%
Scion	tC	$	63,430.27	54.03%
Jeep	Grand Cherokee	$	168,783.36	54.02%
Mazda	Mazda3	$	86,759.69	54.00%
Mitsubishi	Raider	$	106,227.69	53.99%
Suzuki	XL-7	$	131,340.66	53.89%
Chevrolet	SSR	$	187,982.13	53.84%
Audi	S4	$	201,804.24	53.67%
	Ttl Lower Mid-Range SUV	**$**	**161,949.68**	**53.64%**
Ford	Taurus	$	159,702.03	53.60%
	Total Specialty Utility Pickup	**$**	**229,192.50**	**53.33%**
Audi	A4/S4	$	159,093.25	53.07%
Toyota	Tacoma	$	105,053.54	52.95%
Mercury	Mariner Hybrid	$	245,825.33	52.73%
BMW	325	$	137,934.98	52.70%
Nissan	Frontier	$	104,497.17	52.69%

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	Total Budget Cars	**$**	**66,678.86**	**52.69%**
Ford	Escape Hybrid	$	254,789.73	52.68%
Lincoln	Mark LT	$	196,326.91	52.61%
Pontiac	Firebird	$	116,838.69	52.48%
Chevrolet	Cavalier	$	60,291.65	52.37%
Kia	Amanti	$	107,133.08	52.36%
Pontiac	Sunfire	$	62,078.46	52.19%
Toyota	Echo	$	57,584.46	52.18%
Chrysler	Concorde	$	146,146.71	52.16%
Ford	Thunderbird	$	131,697.55	52.15%
Isuzu	Ascender	$	128,392.52	52.09%
Mazda	626	$	124,320.20	52.05%
	Total Small Pickup	**$**	**115,033.58**	**52.00%**
Kia	Sorento	$	98,009.71	51.94%
Isuzu	Rodeo	$	147,257.53	51.92%
Chevrolet	Aveo	$	56,300.75	51.84%
	Ttl Entry Level SUVs	**$**	**126,829.20**	**51.82%**
Ford	Escort	$	56,519.96	51.81%
	Total Economy Cars	**$**	**66,980.04**	**51.77%**
Isuzu	Rodeo Sport	$	102,725.16	51.77%
Suzuki	Aerio	$	72,707.21	51.48%
Mazda	B-Series	$	107,708.77	51.28%
Jeep	Grand Cherokee SRT-8	$	176,276.27	51.18%
Chevrolet	Avalanche	$	236,925.24	51.18%
Saturn	Ion	$	58,327.35	51.11%
Chevrolet	Camaro	$	117,467.20	51.05%
Kia	Sportage	$	94,303.42	50.76%
Jeep	Commander	$	161,525.69	50.73%
Chevrolet	TrailBlazer	$	129,268.38	50.71%
Suzuki	Forenza	$	60,612.77	50.48%
Hyundai	Accent	$	64,823.95	50.37%
Hyundai	Elantra	$	58,909.42	50.28%
Nissan	Sentra	$	79,210.85	50.19%
Ford	Explorer	$	142,374.80	49.97%
Dodge	Neon	$	53,701.94	49.85%
Suzuki	Vitara	$	98,694.24	49.70%
Mazda	Protégé	$	61,436.66	49.41%
Toyota	Highlander Hybrid	$	201,044.29	49.21%
Chevrolet	Colorado	$	101,244.20	48.92%
Honda	Accord Hybrid	$	188,079.70	48.79%
Ford	Ranger	$	88,484.58	48.60%
Chevrolet	Blazer	$	131,060.23	48.41%
Chevrolet	S10	$	64,630.74	48.22%
Mitsubishi	Lancer	$	63,651.41	47.37%
	Ttl Hybrids	**$**	**218,786.11**	**46.38%**
Honda	Civic Hybrid	$	165,330.78	45.19%
Dodge	Dakota	$	78,727.85	45.15%
Honda	Insight	$	137,902.90	43.05%
Lexus	RX 400h	$	426,233.70	42.36%
Chevrolet	Tracker	$	44,840.84	42.23%

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Scion	xB	$	37,076.78	41.05%
Toyota	Prius	$	131,082.41	37.01%
Jeep	Wrangler	$	43,742.45	34.99%

CHAPTER 13 – Reusable

The share of new vehicles that can be reused to support repair and long-term maintenance of vehicles represents the smallest of the disposal segment of the energy research. Generally the share of a new vehicle that can be stripped from a scrapped vehicle and set aside for future repair depends in large part on the used-vehicle marketplace and those vehicles that have a longer life as a mainstream means of transportation.

For example, the Jeep Wrangler is among the models with the most reusable parts and components. Aside from the simplicity of design that generates a low original cost to produce, the image of Jeeps (from CJs to current versions) and usability of the vehicle for secondary purposes long after production generates significant interest in replacement parts.

The Luxury Car segment shows among the lowest reusable parts in large measure because those who are maintaining or restoring such vehicles will turn to the aftermarket for genuine, undamaged pieces.

Hybrids, on the other hand, have a relatively high reusable rate because current versions will have in our estimation long-term core interest among restoration and repair/maintenance owners. The electronics alone will be a valuable asset for these folks.

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Division	Model	Reuseables Disposal	Reuseables Disposal
Kia	Rio	$12,862.33	18.87%
Hyundai	Accent	$12,766.99	19.98%
Chevrolet	Aveo	$11,313.85	21.64%
Toyota	Echo	$11,160.77	21.15%
	Total Budget Cars	**$12,025.99**	**20.41%**
Chevrolet	Cobalt	$14,302.27	18.43%
Toyota	Matrix **	$13,704.26	18.96%
Mazda	Mazda3	$14,202.76	19.21%
Nissan	Sentra	$16,185.34	20.59%
Suzuki	Aerio	$14,255.85	20.81%
Mitsubishi	Lancer	$16,354.15	23.13%
Kia	Spectra	$13,067.40	21.34%
Scion	tC	$12,769.04	23.67%
Suzuki	Forenza	$13,992.47	23.54%
Ford	Focus	$14,045.31	22.55%
Mazda	Protégé	$14,969.37	23.79%
Pontiac	Sunfire	$13,057.72	22.96%
Chevrolet	Cavalier	$12,232.05	22.31%
Scion	xA	$10,420.89	20.50%
Toyota	Corolla	$11,613.45	20.50%
Dodge	Neon	$13,121.05	24.28%
Hyundai	Elantra	$13,623.32	23.38%
Saturn	Ion	$13,125.66	23.53%
Ford	Escort	$14,108.27	26.84%
Scion	xB	$15,649.52	29.40%
	Total Economy Cars	**$13,740.01**	**22.49%**
Nissan	Xterra	$26,979.67	17.40%
Isuzu	Trooper	$27,518.44	15.52%
Mazda	Mazda5	$17,952.65	16.01%
Isuzu	Rodeo	$25,671.70	18.82%
Suzuki	XL-7	$22,827.29	20.32%
Suzuki	Grand Vitara	$19,753.79	19.83%
Kia	Sorento	$20,121.11	22.18%
Chevrolet	Blazer	$31,468.25	22.53%
Suzuki	Vitara	$21,714.96	21.74%
Isuzu	Rodeo Sport	$21,059.89	22.00%
Kia	Sportage	$19,313.71	21.11%
Jeep	Liberty	$19,647.38	20.88%
Chevrolet	Tracker	$18,377.22	29.95%
Jeep	Wrangler	$32,468.11	39.94%
	Ttl Entry Level SUVs	**$23,205.30**	**22.02%**

Mitsubishi	Outlander	$24,857.92	13.94%
Hyundai	Tucson	$21,885.98	15.46%
Mazda	Tribute	$20,503.55	14.37%
Hyundai	Santa Fe	$21,569.34	16.21%
Pontiac	Torrent	$20,609.34	16.04%
Ford	Escape	$21,315.41	16.06%
Mercury	Mariner	$18,220.76	15.48%
Toyota	RAV4	$18,704.07	15.37%
Saturn	Vue	$18,023.29	14.91%
Chevrolet	Equinox	$21,594.82	14.96%
Honda	Element	$17,956.31	15.91%
Pontiac	Aztek	$18,768.55	18.18%
Honda	CR-V	$17,700.87	17.53%
	Ttl Entry Level Sportwagons	**$20,131.55**	**15.72%**
Nissan	Titan	$29,562.91	16.23%
Toyota	Tundra	$33,507.98	15.60%
Dodge	Ram pickup	$34,118.17	14.21%
Chevrolet	Silverado	$35,674.17	14.46%
GMC	Sierra	$35,939.21	14.48%
Ford	F Series	$43,527.62	16.35%
	Ttl Full Size Pickup	**$35,388.34**	**15.22%**
GMC	Savana/G Van	$47,427.90	15.23%
Ford	Econoline/Club Wagon	$45,785.54	15.05%
GMC	Express/G Van	$38,581.39	15.17%
Dodge	Sprinter Van	$50,820.96	13.94%
Dodge	Ram Van	$40,070.08	17.73%
Ford	Econoline van	$43,935.69	16.88%
	Full Size Van	**$44,436.93**	**15.67%**
Honda	Accord Hybrid	$33,808.35	17.13%
Toyota	Prius	$47,656.57	21.37%
Honda	Civic Hybrid	$34,691.15	17.30%
Ford	Escape Hybrid	$32,585.85	16.85%
Mercury	Mariner Hybrid	$31,722.37	16.65%
Honda	Insight	$39,035.79	21.40%
Lexus	RX 400h	$95,379.15	28.67%
Toyota	Highlander Hybrid	$38,185.35	20.86%
	Ttl Hybrids	**$44,133.07**	**20.03%**
Volkswagen	Phaeton	$72,885.67	8.65%
Audi	allroad quattro	$40,856.36	10.36%
Audi	A6	$34,165.73	10.20%
Lexus	LS 430	$38,982.27	10.09%
Lexus	GS 430	$28,696.27	10.84%
Infiniti	Q45	$37,314.77	11.12%
Jaguar	S-Type	$31,640.45	12.14%
Infiniti	M45	$25,657.59	12.81%
Lexus	GS 300	$24,543.51	12.88%

Cadillac	DTS	$25,073.57	11.43%
Cadillac	DeVille	$30,592.93	12.36%
M-Benz	E class	$41,055.56	12.18%
Cadillac	Seville	$27,187.04	14.19%
Volvo	80 series	$28,426.31	12.28%
Cadillac	STS	$32,693.93	11.98%
BMW	5 Series	$25,958.71	11.44%
Acura	RL	$23,750.33	13.68%
Lincoln	Town Car	$34,641.34	13.56%
BMW	M3	$22,145.40	15.42%
	Total Luxury Car	**$32,961.46**	**11.98%**
Volkswagen	Golf	$15,885.09	10.97%
Volkswagen	Golf GTI	$18,398.68	12.93%
Saturn	L series	$21,585.93	13.04%
Honda	Civic	$21,676.62	12.26%
Chevrolet	HHR	$25,809.37	15.68%
Pontiac	G6	$20,434.00	13.27%
Chevrolet	Classic	$22,912.90	11.69%
Subaru	Impreza	$20,805.36	15.46%
Pontiac	Grand Am	$23,175.35	13.63%
Ford	Fusion	$21,501.46	12.93%
Mercury	Milan	$20,509.87	12.72%
Dodge	Stratus	$22,250.31	12.90%
Kia	Optima	$17,259.00	13.24%
Hyundai	Sonata	$17,642.24	13.72%
Suzuki	Verona	$16,831.86	15.36%
Volkswagen	Beetle	$16,543.45	14.53%
Pontiac	Vibe	$13,425.47	18.32%
Chevrolet	Malibu	$15,490.77	13.45%
Chrysler	PT Cruiser	$19,236.44	15.70%
Chrysler	Sebring	$17,206.56	18.27%
	Ttl Lower Mid-Range Cars	**$19,429.04**	**14.00%**
Nissan	Pathfinder	$23,822.76	15.97%
Toyota	4Runner	$27,084.28	16.21%
Mitsubishi	Montero	$26,263.60	17.26%
Mitsubishi	Montero Sport	$23,716.67	17.41%
Isuzu	Axiom	$20,873.75	19.04%
Land Rover	Freelander	$22,665.05	18.83%
Isuzu	Ascender	$25,025.41	21.19%
Jeep	Commander	$31,041.02	19.79%
Jeep	Grand Cherokee	$29,488.23	20.53%
Jeep	Grand Cherokee SRT-8	$35,172.89	26.50%
Dodge	Durango	$26,347.94	21.88%
Ford	Explorer	$30,452.33	21.36%
Chevrolet	TrailBlazer	$26,152.34	20.82%
	Ttl Lower Mid-Range SUV	**$26,777.41**	**19.75%**
Toyota	Sequoia	$32,967.14	13.11%

Nissan	Armada	$32,921.60	14.96%
Ford	Excursion	$50,133.87	13.92%
Chevrolet	Suburban	$39,036.79	12.76%
GMC	Yukon XL	$42,061.39	13.17%
Ford	Expedition	$45,317.69	13.72%
Chevrolet	Tahoe	$41,922.29	12.73%
GMC	Yukon	$38,415.13	12.89%
	Total Large SUV	**$40,346.99**	**13.41%**
Chrysler	Pacifica	$26,130.61	12.78%
Nissan	Murano	$20,710.04	13.13%
Toyota	Highlander	$18,268.19	13.27%
Ford	Freestyle/Windstar	$28,316.15	14.31%
Buick	Rendezvous	$20,188.12	12.60%
Honda	Pilot	$22,631.56	14.89%
Mitsubishi	Endeavor	$16,822.34	15.20%
	Total Mid-Range Sportwagons	**$21,866.72**	**13.74%**
Volkswagen	EuroVan/T4	$22,471.33	14.76%
Honda	Odyssey	$24,800.70	13.67%
Pontiac	Montana SV6	$22,704.60	14.99%
Chrysler	Town & Country	$21,825.92	14.31%
Buick	Terraza	$24,845.82	15.14%
Dodge	Caravan/Grand Caravan	$21,004.89	14.86%
Toyota	Sienna	$20,620.49	14.18%
Chevrolet	Venture	$23,317.85	16.21%
Saturn	Relay	$20,594.62	14.95%
Pontiac	Montana	$21,425.35	14.16%
Nissan	Quest	$19,597.27	13.95%
Chevrolet	Uplander	$24,936.78	16.85%
Ford	Freestar	$23,659.15	16.39%
Mercury	Monterey	$20,610.88	15.69%
Kia	Sedona	$20,531.85	17.42%
Mazda	MPV	$18,473.99	15.84%
GMC	Safari	$24,850.99	17.30%
Chevrolet	Astro	$25,614.69	17.71%
	Total Minivans	**$22,327.06**	**15.47%**
Volvo	70 series	$26,916.29	14.45%
Volvo	60 series	$23,198.19	15.26%
Mercury	Zephyr	$21,248.04	13.82%
Acura	TL	$17,384.32	13.36%
Acura	CL	$19,384.34	13.05%
Lincoln	LS	$17,972.62	15.00%
Jaguar	X-Type	$21,142.09	14.89%
Lexus	ES 330	$21,553.68	15.74%
Lexus	IS 300	$17,034.85	14.53%
Infiniti	G35	$19,489.12	15.02%
M-Benz	C class	$21,056.39	15.89%
Cadillac	CTS	$17,684.59	16.21%

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BMW	330	$19,554.91	16.98%
Buick	Park Avenue	$18,689.42	16.61%
BMW	325	$21,908.32	17.69%
Saab	9-5	$17,799.52	16.82%
	Total Near Luxury Cars	**$20,126.04**	**15.33%**
Audi	A8	$38,675.68	10.27%
M-Benz	S class	$40,503.72	11.96%
Maserati	Maserati	$31,331.69	16.32%
BMW	7 Series	$25,673.11	12.27%
Jaguar	XJ	$21,264.11	12.62%
	Total Premium Cars	**$31,489.66**	**12.69%**
Mercury	Montego	$19,981.49	14.40%
Buick	LaCrosse	$20,021.20	13.62%
Volkswagen	Passat	$20,759.77	13.06%
Dodge	Magnum	$19,133.87	14.45%
Ford	Five Hundred	$21,508.26	14.26%
Dodge	Charger	$21,330.69	14.62%
Nissan	Maxima	$21,198.45	13.45%
Chrysler	300/300M	$23,588.11	15.83%
Mitsubishi	Diamante	$19,337.17	15.30%
Volvo	40 series	$19,280.47	14.53%
Infiniti	I30/I35	$20,852.15	13.84%
Mazda	Millenia	$17,286.00	16.21%
Audi	A4/S4	$24,500.81	17.41%
Audi	S4	$22,151.77	18.14%
Acura	TSX	$15,302.86	14.38%
Saab	9-3	$19,894.05	15.82%
Saab	9-2	$19,824.54	16.92%
Buick	Regal	$15,782.73	19.98%
	Total Premium Mid-Range Cars	**$20,096.35**	**15.35%**
M-Benz	SLK class	$30,138.08	11.71%
M-Benz	CLS class	$31,427.54	10.53%
M-Benz	CLK class	$30,270.16	11.81%
Porsche	Boxster	$23,001.85	12.43%
Chevrolet	Corvette	$20,982.55	11.65%
Audi	TT	$17,712.64	12.64%
BMW	Z8	$24,820.20	13.24%
BMW	Z4	$18,709.34	13.27%
Ford	Thunderbird	$22,300.57	18.46%
Chrysler	Crossfire	$16,827.80	21.88%
	Total Premium Sporty Cars	**$23,619.07**	**13.76%**
Porsche	Cayenne	$31,904.83	10.65%
Volkswagen	Touareg	$29,896.16	11.59%
Land Rover	Range Rover	$36,832.27	13.48%
M-Benz	G class	$48,648.99	13.58%
Hummer	H1	$56,434.10	12.41%

Lexus	LX 470	$36,672.60	13.89%
Cadillac	Escalade ESV	$39,395.11	12.75%
Toyota	Land Cruiser	$49,570.42	13.54%
Hummer	H2	$32,059.68	13.39%
Cadillac	Escalade	$35,643.77	13.66%
Lincoln	Navigator	$35,975.09	16.34%
	Total Premium SUV	**$39,366.64**	**13.21%**
Volvo	XC90	$33,579.94	11.13%
Lexus	RX330	$28,547.37	11.93%
Infiniti	FX35	$29,131.03	13.98%
Infiniti	FX45	$29,590.58	13.96%
M-Benz	R class	$26,908.54	13.60%
Volvo	50 series	$18,891.40	11.96%
Acura	MDX	$24,665.95	12.26%
Cadillac	SRX	$28,884.00	14.20%
M-Benz	M class	$31,806.37	14.95%
BMW	X5	$26,024.71	15.55%
BMW	X3	$21,044.29	14.55%
	Total Premium Sportwagons	**$27,188.56**	**13.46%**
Honda	Accord	$23,412.99	12.76%
Volkswagen	Jetta wagon	$18,166.85	14.75%
Volkswagen	Jetta	$13,792.33	13.80%
Toyota	Camry	$18,159.47	13.00%
Subaru	Baja	$18,172.72	14.83%
Subaru	Legacy	$15,724.34	14.40%
Subaru	Forester	$18,317.71	15.75%
Subaru	Outback	$22,087.99	21.62%
Mazda	Mazda6	$15,863.29	14.48%
Dodge	Intrepid	$22,826.39	17.10%
Chevrolet	Monte Carlo	$18,529.53	16.66%
Mitsubishi	Galant	$15,520.53	16.40%
Pontiac	Grand Prix	$17,051.90	17.78%
Buick	Century	$18,667.08	17.02%
Mercury	Sable	$19,007.16	16.23%
Ford	Taurus	$23,206.56	16.79%
Mazda	626	$21,310.28	18.61%
Nissan	Altima	$14,283.09	16.57%
Chevrolet	Impala	$16,460.90	17.75%
Hyundai	XG350	$15,885.37	18.33%
Kia	Amanti	$19,501.36	20.01%
	Total Small Rid-Range Cars	**$18,378.47**	**16.41%**
Chevrolet	SSR	$28,825.87	17.88%
Honda	Ridgeline	$23,566.53	18.58%
GMC	Canyon	$22,619.27	20.65%
GMC	Sonoma	$21,136.42	20.41%
Nissan	Frontier	$21,334.81	22.73%
Toyota	Tacoma	$18,626.95	19.95%

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Chevrolet	Colorado	$24,315.84	23.00%
Mitsubishi	Raider	$21,861.43	24.15%
Mazda	B-Series	$27,745.45	27.12%
Dodge	Dakota	$25,132.38	26.27%
Ford	Ranger	$23,275.26	24.87%
Chevrolet	S10	$18,402.77	26.52%
	Total Small Pickup	**$23,070.25**	**22.68%**
Cadillac	Escalade EXT	$35,574.93	17.94%
Chevrolet	Avalanche	$44,032.59	19.48%
Lincoln	Mark LT	$32,816.37	18.56%
	Total Specialty Utility Pickup	**$37,474.63**	**18.66%**
Mazda	RX8	$21,890.58	14.95%
Nissan	350Z	$20,973.30	14.37%
Audi	A3	$15,966.41	14.19%
Mitsubishi	Eclipse Spyder	$15,086.71	14.56%
Mitsubishi	Eclipse	$17,684.98	14.96%
Pontiac	GTO	$22,336.64	16.71%
Toyota	Celica	$14,040.90	14.29%
Mini	Mini Cooper S	$17,779.11	14.11%
Acura	RSX	$16,844.63	13.71%
Pontiac	Solstice	$16,179.35	15.30%
Mini	Mini Cooper	$15,019.36	13.91%
Ford	Mustang	$21,611.70	15.52%
Toyota	MR2 Spyder	$16,445.26	14.82%
Mazda	MX-5 Miata	$17,544.53	16.60%
Honda	S2000	$19,078.89	18.92%
Hyundai	Tiburon	$18,442.87	16.06%
Pontiac	Firebird	$21,834.72	20.63%
Chevrolet	Camaro	$24,289.12	21.56%
	Total Touring	**$18,502.72**	**15.84%**
Toyota	Avalon	$22,177.88	13.57%
Buick	Lucerne	$17,603.15	14.54%
Pontiac	Bonneville	$22,231.27	16.63%
Chrysler	Concorde	$24,325.67	18.14%
Mercury	Grand Marquis	$19,991.84	16.49%
Ford	Crown Victoria	$21,699.18	17.49%
Buick	LeSabre	$17,077.05	17.21%
	Total Traditional Car	**$20,729.43**	**16.30%**
Maybach	Maybach	$99,800.04	8.76%
Rolls-Royce	Rolls-Royce	$77,088.53	8.60%
Bentley	Bentley	$92,370.63	8.59%
Porsche	Carrera GT	$49,644.84	13.61%
Lamborghini	Lamborghini	$31,767.49	17.04%
Ferrar	Ferrari	$38,434.37	17.82%
Ford	GT	$28,667.52	15.15%
Aston Martin	Aston Martin	$27,186.86	15.45%

	Total Ultra Luxury	**$55,620.04**	**13.13%**
Lexus	GX 470	$25,838.41	14.90%
Land Rover	Discovery	$33,596.00	14.75%
Land Rover	LR3	$36,217.46	15.44%
Infiniti	QX4	$23,686.27	15.84%
Land Rover	Range Rover Sport	$31,464.01	15.84%
Lincoln	Aviator	$30,461.90	17.03%
Mercury	Mountaineer	$28,445.42	16.32%
Subaru	B9 Tribeca	$22,819.22	16.49%
GMC	Envoy	$27,662.67	16.09%
Buick	Rainier	$20,214.61	14.47%
Saab	9-7X	$21,903.37	16.51%
Hummer	H3	$24,606.06	16.18%
	Total Upper Mid-Range SUV	**$27,242.95**	**15.82%**
Acura	NSX	$34,836.71	10.87%
M-Benz	SC 430	$26,551.13	12.28%
Cadillac	XLR	$22,924.61	12.58%
Jaguar	XK	$27,841.62	12.61%
Porsche	911 Carrera 4	$24,373.11	15.36%
Porsche	911 Carrera	$33,100.03	17.21%
M-Benz	SL Coupe/Roadster	$27,964.76	15.86%
M-Benz	CL class	$25,328.23	12.95%
BMW	6 Series	$23,951.76	15.16%
Lotus	Lotus	$15,796.45	14.41%
Dodge	Viper	$23,141.12	19.79%
	Total Upper Premium Sportscars	**$25,982.68**	**14.46%**
	Industry Straight Average	**$27,570.05**	**17.50%**

CHAPTER 14 – Social Energy Expenditures

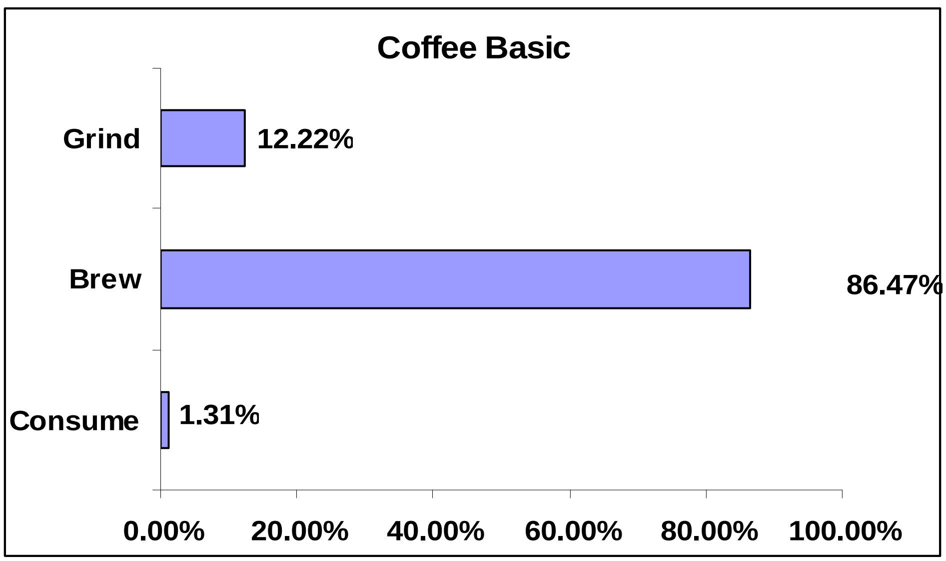
For the CNW evaluation, we used three measures to determine or outline future technological advances in the disposal and other categories. We've listed the total energy cost as "minimum", "medium" and "maximum" to provide a range of what we determined was the likelihood of such technological disposal advances.

As the table below shows, the share of "minimum" of "maximum" is generally in the mid-80 percent range. Luxury vehicles generally have a narrow difference between high and low than do general-market vehicles. Hybrids generally are slightly above industry average because of the complexity of the vehicles and the advances that are being made in making hybrids more "mainstream" which should bring the minimum-to-maximum ratio closer to industry average over time.

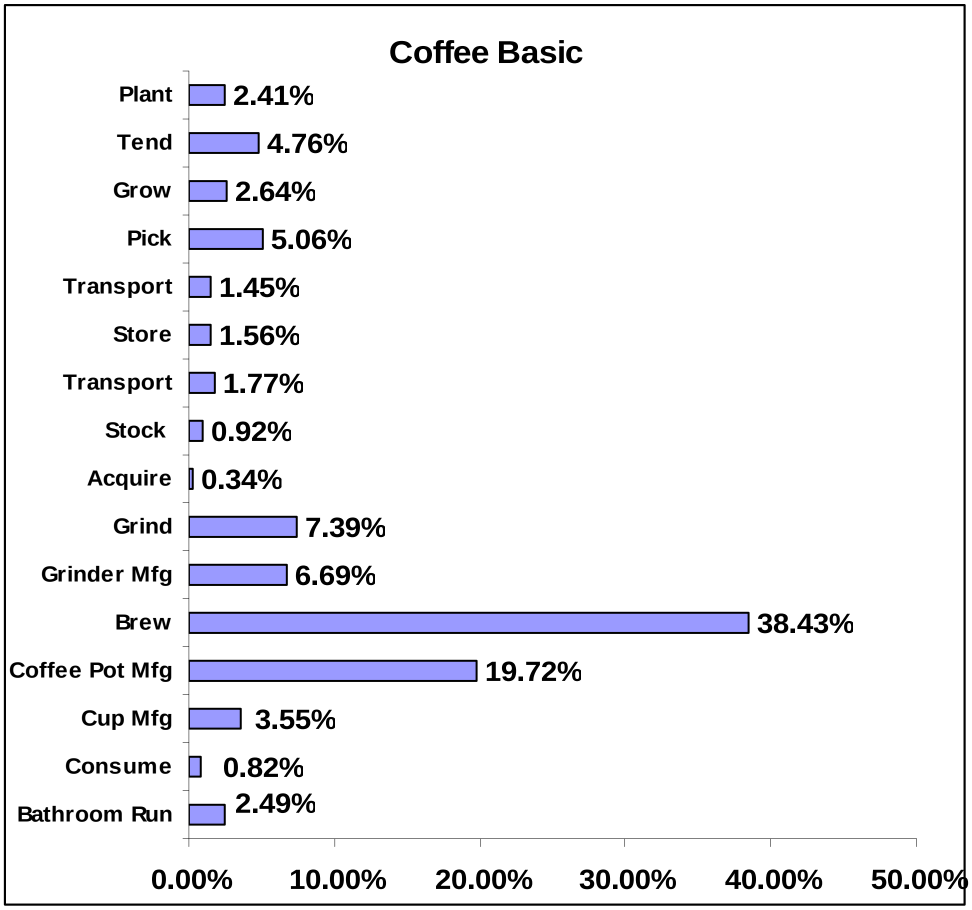
Why do we look at total energy expenditures and why do they differ so dramatically from what auto companies and other research show for vehicles?

Let's show the differences by using another common product: Coffee.

If we used the general automaker methodology for calculating the energy requirements for a vehicle, it would like this for coffee.



But there is more to having a good cup of coffee and the resulting energy cost. Here's a simple expansion of the components in that single cup of joe.



While the above simplified example may seem frivolous, it is used to make a point. Peer reviewed studies of the cost to manufacture a car or truck (see the Q&A section for previous studies) turn a blind eye to the "coffee mug maker" component of having that cup of coffee over your morning paper. While brewing constitutes the largest component in both evaluations, the overall energy necessary to make that coffee is less of the total energy expense when all factors are considered.

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Division	Model	Energy $ Total Minimum	Energy $ Total Medium	Energy $ Total Max.	Min. as Share of Max. E Cost
Kia	Rio	$ 156,174.14	$ 163,694.70	$ 181,626.62	85.99%
Hyundai	Accent	$ 128,707.65	$ 135,374.96	$ 152,942.79	84.15%
Chevrolet	Aveo	$ 108,594.65	$ 113,772.33	$ 128,458.07	84.54%
Toyota	Echo	$ 110,355.83	$ 115,389.62	$ 129,773.44	85.04%
	Total Budget Cars	**$ 125,958.06**	**$ 132,057.90**	**$ 148,200.23**	**84.93%**
Chevrolet	Cobalt	$ 171,217.84	$ 178,493.25	$ 197,987.60	86.48%
Toyota	Matrix **	$ 163,847.66	$ 171,260.86	$ 189,523.67	86.45%
Mazda	Mazda3	$ 160,678.21	$ 168,265.11	$ 186,992.87	85.93%
Nissan	Sentra	$ 157,820.46	$ 165,087.74	$ 186,280.43	84.72%
Suzuki	Aerio	$ 141,223.94	$ 147,461.49	$ 166,926.02	84.60%
Mitsubishi	Lancer	$ 134,364.01	$ 140,736.86	$ 161,743.05	83.07%
Kia	Spectra	$ 136,535.55	$ 143,413.41	$ 160,875.04	84.87%
Scion	tC	$ 117,387.56	$ 123,213.62	$ 139,336.56	84.25%
Suzuki	Forenza	$ 120,063.70	$ 125,775.20	$ 143,235.78	83.82%
Ford	Focus	$ 135,671.89	$ 142,063.92	$ 159,276.94	85.18%
Mazda	Protégé	$ 124,349.84	$ 129,870.51	$ 149,453.05	83.20%
Pontiac	Sunfire	$ 118,948.48	$ 124,577.57	$ 140,769.59	84.50%
Chevrolet	Cavalier	$ 115,123.01	$ 120,808.46	$ 137,340.69	83.82%
Scion	xA	$ 114,745.05	$ 120,601.42	$ 134,802.14	85.12%
Toyota	Corolla	$ 123,726.46	$ 129,571.48	$ 144,378.18	85.70%
Dodge	Neon	$ 107,734.67	$ 113,236.77	$ 129,858.43	82.96%
Hyundai	Elantra	$ 117,170.36	$ 122,606.51	$ 140,818.45	83.21%
Saturn	Ion	$ 114,115.77	$ 119,540.47	$ 136,030.44	83.89%
Ford	Escort	$ 109,087.46	$ 113,369.90	$ 131,564.88	82.92%
Scion	xB	$ 90,313.02	$ 94,293.42	$ 112,831.88	80.04%
	Total Economy Cars	**$ 128,706.25**	**$ 134,712.40**	**$ 152,501**	**84.24%**
Nissan	Xterra	$ 386,122.45	$ 401,765.65	$ 442,622.55	87.24%
Isuzu	Trooper	$ 398,915.58	$ 414,511.60	$ 451,587.90	88.34%
Mazda	Mazda5	$ 287,187.32	$ 300,664.24	$ 325,641.49	88.19%
Isuzu	Rodeo	$ 283,641.15	$ 294,607.27	$ 329,555.21	86.07%
Suzuki	XL-7	$ 243,701.80	$ 254,925.48	$ 286,265.51	85.13%
Suzuki	Grand Vitara	$ 241,819.87	$ 252,339.49	$ 279,551.87	86.50%
Kia	Sorento	$ 188,711.64	$ 198,258.94	$ 225,141.37	83.82%
Chevrolet	Blazer	$ 270,731.19	$ 281,519.16	$ 319,727.28	84.68%
Suzuki	Vitara	$ 198,579.53	$ 208,098.02	$ 235,782.42	84.22%
Isuzu	Rodeo Sport	$ 198,438.16	$ 208,391.31	$ 234,664.17	84.56%
Kia	Sportage	$ 185,788.11	$ 194,605.54	$ 219,358.20	84.70%
Jeep	Liberty	$ 207,761.70	$ 216,744.29	$ 243,023.00	85.49%
Chevrolet	Tracker	$ 106,192.40	$ 111,298.91	$ 132,292.72	80.27%

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Jeep	Wrangler	$ 125,027.22	$ 129,722.15	$ 166,348.49	75.16%
	Ttl Entry Level SUVs	**$ 237,329.87**	**$ 247,675.15**	**$ 277,968.73**	**84.60%**
Mitsubishi	Outlander	$ 414,728.21	$ 431,967.42	$ 469,611.33	88.31%
Hyundai	Tucson	$ 323,422.93	$ 339,056.87	$ 368,376.72	87.80%
Mazda	Tribute	$ 338,366.25	$ 354,893.75	$ 384,216.61	88.07%
Hyundai	Santa Fe	$ 304,888.51	$ 320,328.67	$ 352,776.73	86.43%
Pontiac	Torrent	$ 319,783.24	$ 335,906.01	$ 365,204.43	87.56%
Ford	Escape	$ 314,015.95	$ 330,137.64	$ 361,960.66	86.75%
Mercury	Mariner	$ 294,178.32	$ 309,504.65	$ 336,638.66	87.39%
Toyota	RAV4	$ 315,568.77	$ 330,623.32	$ 358,262.00	88.08%
Saturn	Vue	$ 297,420.16	$ 310,196.81	$ 335,703.66	88.60%
Chevrolet	Equinox	$ 344,228.52	$ 359,061.09	$ 391,360.10	87.96%
Honda	Element	$ 256,535.68	$ 269,890.54	$ 295,517.99	86.81%
Pontiac	Aztek	$ 259,017.93	$ 271,098.09	$ 296,640.79	87.32%
Honda	CR-V	$ 230,523.84	$ 241,813.15	$ 265,164.99	86.94%
	Ttl Entry Level Sportwagons	**$ 308,667.56**	**$ 323,421.39**	**$ 352,418.05**	**87.54%**
Nissan	Titan	$ 454,755.91	$ 473,093.61	$ 514,104.36	88.46%
Toyota	Tundra	$ 479,219.35	$ 500,425.50	$ 548,420.46	87.38%
Dodge	Ram pickup	$ 573,796.67	$ 598,064.41	$ 645,927.42	88.83%
Chevrolet	Silverado	$ 585,573.74	$ 606,606.68	$ 660,617.33	88.64%
GMC	Sierra	$ 568,423.04	$ 587,897.47	$ 637,874.92	89.11%
Ford	F Series	$ 641,038.06	$ 663,778.27	$ 730,396.08	87.77%
	Ttl Full Size Pickup	**$ 550,467.79**	**$ 571,644.32**	**$ 622,890.09**	**88.36%**
GMC	Savana/G Van	$ 732,115.10	$ 755,412.74	$ 825,779.27	88.66%
Ford	Econoline/Club Wagon	$ 693,102.98	$ 716,196.80	$ 785,240.39	88.27%
GMC	Express/G Van	$ 628,009.32	$ 652,042.19	$ 708,400.26	88.65%
Dodge	Sprinter Van	$ 922,079.89	$ 951,081.60	$1,036,932.38	88.92%
Dodge	Ram Van	$ 514,611.42	$ 535,844.86	$ 587,639.59	87.57%
Ford	Econoline van	$ 616,754.27	$ 637,703.14	$ 699,965.56	88.11%
	Full Size Van	**$ 684,445.50**	**$ 708,046.89**	**$ 773,992.91**	**88.36%**
Honda	Accord Hybrid	$ 385,469.86	$ 415,107.70	$ 461,548.51	83.52%
Toyota	Prius	$ 354,137.15	$ 384,329.24	$ 445,154.68	79.55%
Honda	Civic Hybrid	$ 365,857.28	$ 393,292.46	$ 438,483.86	83.44%
Ford	Escape Hybrid	$ 448,177.55	$ 478,869.66	$ 540,285.25	82.95%
Mercury	Mariner Hybrid	$ 436,350.10	$ 466,780.25	$ 526,010.57	82.95%
Honda	Insight	$ 320,323.18	$ 345,170.77	$ 395,152.90	81.06%
Lexus	RX 400h	$ 758,912.99	$ 819,260.18	$ 977,808.44	77.61%
Toyota	Highlander Hybrid	$ 384,099.67	$ 419,667.85	$ 485,541.41	79.11%
	Ttl Hybrids	**$ 431,665.97**	**$ 465,309.76**	**$ 533,748.20**	**81.27%**
Volkswagen	Phaeton	$ 2,702,233.01	$2,804,809.75	$2,993,981.42	90.26%
Audi	allroad quattro	$ 1,130,240.16	$1,174,474.70	$1,265,237.38	89.33%
Audi	A6	$ 938,058.67	$ 974,932.37	$1,044,499.31	89.81%
Lexus	LS 430	$ 1,055,582.45	$1,094,547.52	$1,169,227.26	90.28%
Lexus	GS 430	$ 799,290.72	$ 833,167.01	$ 887,391.82	90.07%
Infiniti	Q45	$ 852,831.88	$ 886,866.04	$ 958,038.58	89.02%

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Jaguar	S-Type	$ 658,254.04	$ 686,246.56	$ 744,737.64	88.39%
Infiniti	M45	$ 488,379.92	$ 512,712.48	$ 554,988.67	88.00%
Lexus	GS 300	$ 505,831.02	$ 533,968.30	$ 575,012.27	87.97%
Cadillac	DTS	$ 659,504.49	$ 686,586.82	$ 727,789.30	90.62%
Cadillac	DeVille	$ 687,141.06	$ 712,116.56	$ 760,213.99	90.39%
M-Benz	E class	$ 848,007.77	$ 875,281.50	$ 948,218.34	89.43%
Cadillac	Seville	$ 535,476.90	$ 562,751.68	$ 604,385.24	88.60%
Volvo	80 series	$ 666,751.47	$ 691,070.86	$ 741,260.74	89.95%
Cadillac	STS	$ 685,819.68	$ 714,171.68	$ 764,720.92	89.68%
BMW	5 Series	$ 649,928.17	$ 678,059.87	$ 720,911.78	90.15%
Acura	RL	$ 452,974.11	$ 475,148.16	$ 511,518.34	88.55%
Lincoln	Town Car	$ 603,649.94	$ 628,839.88	$ 684,331.53	88.21%
BMW	M3	$ 389,952.58	$ 410,197.22	$ 446,125.18	87.41%
	Total Luxury Car	**$ 805,784.63**	**$ 838,734.16**	**$ 900,136.30**	**89.27%**
Volkswagen	Golf	$ 407,246.85	$ 428,808.14	$ 456,177.80	89.27%
Volkswagen	Golf GTI	$ 397,802.42	$ 418,921.62	$ 451,242.20	88.16%
Saturn	L series	$ 415,541.56	$ 433,333.95	$ 467,069.27	88.97%
Honda	Civic	$ 430,787.98	$ 450,747.78	$ 486,032.13	88.63%
Chevrolet	HHR	$ 405,093.00	$ 431,627.56	$ 471,387.92	85.94%
Pontiac	G6	$ 372,395.71	$ 391,133.32	$ 424,578.27	87.71%
Chevrolet	Classic	$ 519,595.06	$ 540,663.66	$ 577,723.53	89.94%
Subaru	Impreza	$ 304,763.59	$ 319,003.52	$ 347,292.37	87.75%
Pontiac	Grand Am	$ 427,019.69	$ 444,191.62	$ 477,229.42	89.48%
Ford	Fusion	$ 422,825.83	$ 439,317.58	$ 469,915.85	89.98%
Mercury	Milan	$ 416,219.18	$ 433,738.59	$ 468,169.92	88.90%
Dodge	Stratus	$ 435,147.50	$ 452,273.72	$ 488,074.44	89.16%
Kia	Optima	$ 321,009.89	$ 337,263.55	$ 364,096.35	88.17%
Hyundai	Sonata	$ 320,737.46	$ 334,393.32	$ 362,566.20	88.46%
Suzuki	Verona	$ 289,971.20	$ 302,715.51	$ 329,481.78	88.01%
Volkswagen	Beetle	$ 312,577.99	$ 327,428.05	$ 353,734.81	88.37%
Pontiac	Vibe	$ 162,836.26	$ 170,005.56	$ 189,051.62	86.13%
Chevrolet	Malibu	$ 312,796.18	$ 328,122.18	$ 351,577.89	88.97%
Chrysler	PT Cruiser	$ 309,497.39	$ 321,541.35	$ 347,688.61	89.02%
Chrysler	Sebring	$ 210,467.53	$ 219,447.95	$ 242,122.46	86.93%
	Ttl Lower Mid-Range Cars	**$ 359,716.61**	**$ 376,233.93**	**$ 406,261**	**88.40%**
Nissan	Pathfinder	$ 350,781.18	$ 367,242.54	$ 404,284.95	86.77%
Toyota	4Runner	$ 386,035.32	$ 402,551.80	$ 440,391.02	87.66%
Mitsubishi	Montero	$ 341,740.87	$ 357,667.56	$ 395,642.35	86.38%
Mitsubishi	Montero Sport	$ 301,493.03	$ 317,717.45	$ 352,378.32	85.56%
Isuzu	Axiom	$ 246,359.29	$ 258,563.36	$ 286,122.52	86.10%
Land Rover	Freelander	$ 264,501.27	$ 277,775.35	$ 309,979.64	85.33%
Isuzu	Ascender	$ 246,486.91	$ 257,921.41	$ 289,232.19	85.22%
Jeep	Commander	$ 318,391.67	$ 331,141.19	$ 373,619.47	85.22%
Jeep	Grand Cherokee	$ 312,433.43	$ 323,638.56	$ 362,657.63	86.15%
Jeep	Grand Cherokee SRT-8	$ 309,004.15	$ 340,639.25	$ 372,199.35	83.02%
Dodge	Durango	$ 262,868.19	$ 274,632.58	$ 310,092.71	84.77%
Ford	Explorer	$ 284,930.38	$ 297,483.19	$ 335,406.85	84.95%
Chevrolet	TrailBlazer	$ 254,900.15	$ 264,716.22	$ 298,176.44	85.49%

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	Ttl Lower Mid-Range SUV	**$ 298,455.83**	**$ 313,206.96**	**$ 348,475.65**	**85.59%**
Toyota	Sequoia	$ 642,657.15	$ 671,700.63	$ 725,272.96	88.61%
Nissan	Armada	$ 558,855.31	$ 584,155.91	$ 636,424.86	87.81%
Ford	Excursion	$ 888,759.97	$ 920,839.51	$ 998,491.61	89.01%
Chevrolet	Suburban	$ 852,342.99	$ 879,359.63	$ 948,713.24	89.84%
GMC	Yukon XL	$ 848,810.31	$ 879,328.71	$ 947,041.49	89.63%
Ford	Expedition	$ 868,548.06	$ 897,217.60	$ 965,986.78	89.91%
Chevrolet	Tahoe	$ 787,123.18	$ 816,298.06	$ 876,628.96	89.79%
GMC	Yukon	$ 777,986.91	$ 806,583.89	$ 871,752.44	89.24%
	Total Large SUV	**$ 778,135.48**	**$ 806,935.49**	**$ 871,289.04**	**89.23%**
Chrysler	Pacifica	$ 508,731.47	$ 532,499.88	$ 573,543.96	88.70%
Nissan	Murano	$ 446,733.38	$ 465,497.91	$ 497,587.91	89.78%
Toyota	Highlander	$ 388,379.64	$ 406,858.85	$ 433,897.74	89.51%
Ford	Freestyle/Windstar	$ 511,141.32	$ 530,947.66	$ 572,614.72	89.26%
Buick	Rendezvous	$ 401,885.99	$ 418,543.23	$ 451,865.15	88.94%
Honda	Pilot	$ 342,780.26	$ 358,759.20	$ 390,548.13	87.77%
Mitsubishi	Endeavor	$ 302,017.51	$ 317,876.96	$ 346,387.14	87.19%
	Total Mid-Range Sportwagons	**$ 414,524.22**	**$ 432,997.67**	**$ 466,634.96**	**88.74%**
Volkswagen	EuroVan/T4	$ 364,747.21	$ 382,509.93	$ 414,800.91	87.93%
Honda	Odyssey	$ 435,218.92	$ 451,909.26	$ 487,930.78	89.20%
Pontiac	Montana SV6	$ 371,720.05	$ 389,018.00	$ 421,838.59	88.12%
Chrysler	Town & Country	$ 379,307.18	$ 396,021.67	$ 428,547.84	88.51%
Buick	Terraza	$ 395,866.40	$ 413,668.63	$ 450,078.02	87.96%
Dodge	Caravan/Grand Caravan	$ 357,661.98	$ 373,348.89	$ 401,992.90	88.97%
Toyota	Sienna	$ 344,460.45	$ 361,950.93	$ 391,901.47	87.89%
Chevrolet	Venture	$ 370,836.02	$ 387,586.14	$ 424,206.61	87.42%
Saturn	Relay	$ 347,177.33	$ 363,829.11	$ 394,053.94	88.10%
Pontiac	Montana	$ 355,627.39	$ 373,050.34	$ 405,214.39	87.76%
Nissan	Quest	$ 338,846.55	$ 354,059.88	$ 382,644.86	88.55%
Chevrolet	Uplander	$ 330,298.81	$ 346,338.90	$ 379,666.16	87.00%
Ford	Freestar	$ 333,061.59	$ 347,582.67	$ 383,013.45	86.96%
Mercury	Monterey	$ 328,924.18	$ 345,653.97	$ 375,027.00	87.71%
Kia	Sedona	$ 275,151.33	$ 288,735.46	$ 318,648.12	86.35%
Mazda	MPV	$ 304,608.48	$ 318,149.25	$ 345,583.91	88.14%
GMC	Safari	$ 348,422.14	$ 363,105.11	$ 397,587.84	87.63%
Chevrolet	Astro	$ 353,546.41	$ 366,655.68	$ 405,879.53	87.11%
	Total Minivans	**$ 351,971.24**	**$ 367,954.10**	**$ 400,478.69**	**87.85%**
Volvo	70 series	$ 459,216.30	$ 480,125.81	$ 520,961.08	88.15%
Volvo	60 series	$ 365,265.31	$ 383,579.40	$ 416,121.04	87.78%
Mercury	Zephyr	$ 393,054.78	$ 410,980.36	$ 445,372.27	88.25%
Acura	TL	$ 362,897.68	$ 379,937.84	$ 410,011.25	88.51%
Acura	CL	$ 367,972.86	$ 385,498.03	$ 419,487.14	87.72%
Lincoln	LS	$ 314,677.87	$ 328,408.05	$ 358,318.07	87.82%
Jaguar	X-Type	$ 322,526.63	$ 337,188.83	$ 368,164.49	87.60%
Lexus	ES 330	$ 318,542.85	$ 332,009.62	$ 361,733.04	88.06%
Lexus	IS 300	$ 296,921.70	$ 311,767.45	$ 340,280.59	87.26%

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Infiniti	G35	$ 305,667.74	$ 318,810.22	$ 346,663.48	88.17%
M-Benz	C class	$ 290,586.74	$ 303,891.11	$ 333,189.99	87.21%
Cadillac	CTS	$ 268,870.36	$ 281,010.10	$ 305,248.78	88.08%
BMW	330	$ 284,483.45	$ 296,267.15	$ 323,152.17	88.03%
Buick	Park Avenue	$ 278,569.40	$ 291,020.99	$ 318,346.61	87.51%
BMW	325	$ 261,754.69	$ 273,270.42	$ 302,066.76	86.65%
Saab	9-5	$ 247,739.57	$ 259,896.03	$ 284,730.66	87.01%
	Total Near Luxury Cars	**$ 321,171.75**	**$ 335,853.84**	**$ 365,865.46**	**87.74%**
Audi	A8	$ 1,062,350.59	$1,102,473.99	$1,189,584.36	89.30%
M-Benz	S class	$ 920,891.53	$ 952,453.28	$1,042,528.22	88.33%
Maserati	Maserati	$ 494,843.00	$ 516,801.37	$ 583,614.69	84.79%
BMW	7 Series	$ 590,095.73	$ 612,579.47	$ 664,071.39	88.86%
Jaguar	XJ	$ 451,147.64	$ 471,878.40	$ 504,662.66	89.40%
	Total Premium Cars	**$ 703,865.70**	**$ 731,237.30**	**$ 796,892.26**	**88.14%**
Mercury	Montego	$ 344,063.35	$ 360,438.68	$ 392,132.84	87.74%
Buick	LaCrosse	$ 370,412.16	$ 388,296.44	$ 419,060.33	88.39%
Volkswagen	Passat	$ 393,987.16	$ 408,790.48	$ 440,025.50	89.54%
Dodge	Magnum	$ 369,500.65	$ 384,858.69	$ 417,654.99	88.47%
Ford	Five Hundred	$ 347,121.37	$ 362,766.27	$ 393,790.86	88.15%
Dodge	Charger	$ 339,480.73	$ 354,098.00	$ 385,614.98	88.04%
Nissan	Maxima	$ 379,365.84	$ 394,937.39	$ 427,043.97	88.84%
Chrysler	300/300M	$ 376,599.14	$ 393,867.93	$ 429,200.43	87.74%
Mitsubishi	Diamante	$ 291,732.39	$ 306,177.29	$ 334,172.15	87.30%
Volvo	40 series	$ 307,259.09	$ 322,258.80	$ 349,774.30	87.84%
Infiniti	I30/I35	$ 347,944.04	$ 362,031.94	$ 392,115.98	88.73%
Mazda	Millenia	$ 245,061.96	$ 258,012.41	$ 282,081.71	86.88%
Audi	A4/S4	$ 299,797.13	$ 314,288.97	$ 348,924.43	85.92%
Audi	S4	$ 323,919.85	$ 352,168.91	$ 378,278.85	85.63%
Acura	TSX	$ 291,543.17	$ 303,470.94	$ 328,700.85	88.70%
Saab	9-3	$ 297,755.17	$ 311,014.65	$ 339,826.40	87.62%
Saab	9-2	$ 265,489.85	$ 277,320.91	$ 304,906.46	87.07%
Buick	Regal	$ 177,310.32	$ 186,602.15	$ 207,639.95	85.39%
	Total Premium Mid-Range Cars	**$ 320,463.52**	**$ 335,633.38**	**$ 365,052.50**	**87.67%**
M-Benz	SLK class	$ 633,068.80	$ 661,051.24	$ 713,911.68	88.68%
M-Benz	CLS class	$ 869,236.23	$ 902,614.79	$ 960,409.56	90.51%
M-Benz	CLK class	$ 666,913.20	$ 695,312.68	$ 747,981.12	89.16%
Porsche	Boxster	$ 506,118.66	$ 529,868.53	$ 569,726.00	88.84%
Chevrolet	Corvette	$ 511,621.38	$ 535,341.40	$ 576,522.66	88.74%
Audi	TT	$ 390,312.38	$ 409,000.04	$ 435,901.11	89.54%
BMW	Z8	$ 483,754.60	$ 504,538.00	$ 542,032.97	89.25%
BMW	Z4	$ 364,999.02	$ 383,815.97	$ 412,995.89	88.38%
Ford	Thunderbird	$ 252,521.72	$ 263,784.62	$ 293,012.29	86.18%
Chrysler	Crossfire	$ 173,325.81	$ 183,184.79	$ 206,507.11	83.93%
	Total Premium Sporty Cars	**$ 485,187.18**	**$ 506,851.21**	**$ 545,900.04**	**88.32%**
Porsche	Cayenne	$ 800,178.00	$ 823,904.40	$ 885,974.34	90.32%

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Volkswagen	Touareg	$ 768,919.36	$ 801,918.77	$ 859,430.59	89.47%
Land Rover	Range Rover	$ 777,733.63	$ 811,413.12	$ 875,303.68	88.85%
M-Benz	G class	$ 879,415.33	$ 914,435.58	$ 996,651.77	88.24%
Hummer	H1	$ 1,328,374.24	$1,365,465.81	$1,457,118.57	91.16%
Lexus	LX 470	$ 687,795.13	$ 717,276.19	$ 773,735.56	88.89%
Cadillac	Escalade ESV	$ 748,025.16	$ 779,140.97	$ 846,343.33	88.38%
Toyota	Land Cruiser	$ 958,361.88	$ 987,125.50	$1,059,531.44	90.45%
Hummer	H2	$ 596,241.72	$ 618,337.25	$ 664,249.52	89.76%
Cadillac	Escalade	$ 657,897.93	$ 682,810.74	$ 738,879.34	89.04%
Lincoln	Navigator	$ 525,965.61	$ 546,647.69	$ 595,693.02	88.29%
	Total Premium SUV	**$ 793,537.09**	**$ 822,588.73**	**$ 886,628.29**	**89.35%**
Volvo	XC90	$ 761,323.39	$ 792,753.09	$ 850,768.46	89.49%
Lexus	RX330	$ 634,780.65	$ 660,243.25	$ 710,353.36	89.36%
Infiniti	FX35	$ 524,070.18	$ 546,688.08	$ 590,447.58	88.76%
Infiniti	FX45	$ 578,697.22	$ 605,552.85	$ 649,764.56	89.06%
M-Benz	R class	$ 485,496.15	$ 508,506.84	$ 547,116.03	88.74%
Volvo	50 series	$ 458,176.18	$ 480,287.46	$ 515,844.98	88.82%
Acura	MDX	$ 554,773.36	$ 577,778.42	$ 620,853.14	89.36%
Cadillac	SRX	$ 475,791.71	$ 498,374.65	$ 541,288.70	87.90%
M-Benz	M class	$ 533,525.51	$ 554,416.51	$ 605,122.98	88.17%
BMW	X5	$ 393,068.28	$ 410,148.41	$ 446,765.84	87.98%
BMW	X3	$ 378,139.93	$ 395,490.81	$ 427,724.71	88.41%
	Total Premium Sportwagons	**$ 525,258.41**	**$ 548,203.67**	**$ 591,459.12**	**88.73%**
Honda	Accord	$ 455,595.76	$ 474,696.53	$ 510,750.84	89.20%
Volkswagen	Jetta wagon	$ 278,273.16	$ 293,837.55	$ 322,568.93	86.27%
Volkswagen	Jetta	$ 266,103.90	$ 280,859.28	$ 301,251.22	88.33%
Toyota	Camry	$ 386,861.43	$ 404,686.10	$ 433,529.91	89.24%
Subaru	Baja	$ 299,740.92	$ 312,705.84	$ 340,125.50	88.13%
Subaru	Legacy	$ 288,451.52	$ 301,233.59	$ 326,042.88	88.47%
Subaru	Forester	$ 301,205.39	$ 315,406.85	$ 343,825.78	87.60%
Subaru	Outback	$ 281,970.95	$ 304,281.46	$ 329,184.41	85.66%
Mazda	Mazda6	$ 290,997.58	$ 304,198.68	$ 330,052.85	88.17%
Dodge	Intrepid	$ 315,456.85	$ 330,199.83	$ 362,618.83	86.99%
Chevrolet	Monte Carlo	$ 284,669.24	$ 296,976.46	$ 323,779.11	87.92%
Mitsubishi	Galant	$ 224,138.07	$ 235,367.26	$ 257,319.79	87.10%
Pontiac	Grand Prix	$ 235,818.19	$ 247,814.76	$ 270,382.73	87.22%
Buick	Century	$ 253,151.24	$ 263,773.37	$ 289,030.14	87.59%
Mercury	Sable	$ 290,904.07	$ 302,422.83	$ 329,852.59	88.19%
Ford	Taurus	$ 297,938.26	$ 310,171.35	$ 343,970.41	86.62%
Mazda	626	$ 238,840.14	$ 250,056.99	$ 278,866.25	85.65%
Nissan	Altima	$ 211,333.40	$ 221,276.87	$ 243,156.38	86.91%
Chevrolet	Impala	$ 236,112.21	$ 245,812.04	$ 268,065.38	88.08%
Hyundai	XG350	$ 194,080.61	$ 204,058.55	$ 227,501.73	85.31%
Kia	Amanti	$ 204,600.84	$ 213,473.64	$ 240,050.50	85.23%
	Total Small Rid-Range Cars	**$ 277,916.37**	**$ 291,109.99**	**$ 317,710.77**	**87.33%**
Chevrolet	SSR	$ 349,170.93	$ 365,806.46	$ 406,428.29	85.91%

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Honda	Ridgeline	$ 294,554.07	$ 308,176.20	$ 338,889.56	86.92%
GMC	Canyon	$ 241,267.66	$ 250,832.94	$ 281,446.43	85.72%
GMC	Sonoma	$ 239,984.32	$ 250,279.00	$ 277,596.07	86.45%
Nissan	Frontier	$ 198,340.98	$ 207,683.56	$ 234,629.40	84.53%
Toyota	Tacoma	$ 198,410.43	$ 207,951.28	$ 232,939.27	85.18%
Chevrolet	Colorado	$ 206,961.85	$ 215,550.01	$ 246,674.07	83.90%
Mitsubishi	Raider	$ 196,752.82	$ 204,772.64	$ 232,073.11	84.78%
Mazda	B-Series	$ 210,027.23	$ 218,291.70	$ 252,088.04	83.32%
Dodge	Dakota	$ 174,383.85	$ 181,943.88	$ 212,194.72	82.18%
Ford	Ranger	$ 182,069.65	$ 190,497.75	$ 220,990.83	82.39%
Chevrolet	S10	$ 134,027.77	$ 139,609.16	$ 162,509.47	82.47%
	Total Small Pickup	**$ 218,829.30**	**$ 228,449.55**	**$ 258,204.94**	**84.48%**
Cadillac	Escalade EXT	$ 452,573.57	$ 469,650.62	$ 518,870.82	87.22%
Chevrolet	Avalanche	$ 462,942.87	$ 478,945.85	$ 537,951.12	86.06%
Lincoln	Mark LT	$ 373,159.23	$ 389,591.78	$ 436,158.77	85.56%
	Total Specialty Utility Pickup	**$ 429,558.55**	**$ 446,062.75**	**$ 497,660.24**	**86.28%**
Mazda	RX8	$ 345,032.79	$ 362,764.70	$ 393,990.76	87.57%
Nissan	350Z	$ 342,052.81	$ 359,453.23	$ 391,858.48	87.29%
Audi	A3	$ 291,370.88	$ 305,787.49	$ 331,518.03	87.89%
Mitsubishi	Eclipse Spyder	$ 247,402.60	$ 261,156.48	$ 282,413.16	87.60%
Mitsubishi	Eclipse	$ 290,966.66	$ 304,639.63	$ 331,139.30	87.87%
Pontiac	GTO	$ 291,209.63	$ 306,293.45	$ 335,222.20	86.87%
Toyota	Celica	$ 273,631.40	$ 286,837.85	$ 309,869.16	88.31%
Mini	Mini Cooper S	$ 307,140.55	$ 322,019.73	$ 347,357.17	88.42%
Acura	RSX	$ 303,325.14	$ 317,388.12	$ 344,788.94	87.97%
Pontiac	Solstice	$ 287,673.27	$ 300,816.79	$ 325,290.69	88.44%
Mini	Mini Cooper	$ 303,405.64	$ 317,933.07	$ 339,569.16	89.35%
Ford	Mustang	$ 318,197.05	$ 331,044.96	$ 360,819.47	88.19%
Toyota	MR2 Spyder	$ 272,589.07	$ 284,221.18	$ 309,753.20	88.00%
Mazda	MX-5 Miata	$ 267,649.11	$ 279,395.15	$ 303,304.08	88.24%
Honda	S2000	$ 235,692.53	$ 247,640.43	$ 275,159.38	85.66%
Hyundai	Tiburon	$ 276,229.25	$ 287,364.34	$ 314,753.03	87.76%
Pontiac	Firebird	$ 222,654.46	$ 233,450.96	$ 262,550.90	84.80%
Chevrolet	Camaro	$ 230,112.99	$ 240,821.77	$ 270,961.74	84.92%
	Total Touring	**$ 283,685.32**	**$ 297,168.30**	**$ 323,906.60**	**87.51%**
Toyota	Avalon	$ 395,436.16	$ 410,942.26	$ 446,525.71	88.56%
Buick	Lucerne	$ 318,940.94	$ 331,934.96	$ 359,471.59	88.72%
Pontiac	Bonneville	$ 326,114.53	$ 341,336.32	$ 373,843.32	87.23%
Chrysler	Concorde	$ 280,213.27	$ 292,556.19	$ 326,763.61	85.75%
Mercury	Grand Marquis	$ 293,491.37	$ 306,043.91	$ 334,950.70	87.62%
Ford	Crown Victoria	$ 300,372.41	$ 313,317.03	$ 342,666.39	87.66%
Buick	LeSabre	$ 251,109.53	$ 262,462.05	$ 287,197.44	87.43%
	Total Traditional Car	**$ 309,382.60**	**$ 322,656.10**	**$ 353,059.82**	**87.57%**
Maybach	Maybach	$ 2,976,624.99	$3,070,870.33	$3,279,156.45	90.77%
Rolls-Royce	Rolls-Royce	$ 2,910,215.10	$3,012,857.62	$3,182,312.30	91.45%
Bentley	Bentley	$ 2,860,494.75	$2,957,223.03	$3,124,208.24	91.56%

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Porsche	Carrera GT	$ 842,141.08	$ 878,094.11	$ 970,090.06	86.81%
Lamborghini	Lamborghini	$ 485,035.97	$ 510,935.19	$ 578,227.68	83.88%
Ferrar	Ferrari	$ 471,469.74	$ 498,259.13	$ 578,338.04	81.52%
Ford	GT	$ 446,687.24	$ 472,453.18	$ 543,679.63	82.16%
Aston Martin	Aston Martin	$ 472,380.52	$ 493,749.24	$ 544,767.70	86.71%
	Total Ultra Luxury	**$ 1,433,131.17**	**$1,486,805.23**	**$1,600,097.51**	**86.86%**
Lexus	GX 470	$ 475,500.88	$ 495,676.09	$ 537,303.41	88.50%
Land Rover	Discovery	$ 512,565.78	$ 531,564.97	$ 580,862.60	88.24%
Land Rover	LR3	$ 552,639.62	$ 572,746.24	$ 627,821.32	88.02%
Infiniti	QX4	$ 374,930.97	$ 393,996.96	$ 430,036.27	87.19%
Land Rover	Range Rover Sport	$ 498,602.94	$ 520,051.20	$ 565,719.17	88.14%
Lincoln	Aviator	$ 448,280.80	$ 466,602.32	$ 510,834.92	87.75%
Mercury	Mountaineer	$ 399,409.87	$ 416,947.30	$ 458,757.33	87.06%
Subaru	B9 Tribeca	$ 329,318.09	$ 344,666.87	$ 377,731.80	87.18%
GMC	Envoy	$ 443,509.45	$ 460,749.96	$ 505,009.73	87.82%
Buick	Rainier	$ 383,659.59	$ 401,702.12	$ 434,844.37	88.23%
Saab	9-7X	$ 310,144.09	$ 325,914.06	$ 359,267.39	86.33%
Hummer	H3	$ 403,531.58	$ 421,003.58	$ 459,844.62	87.75%
	Total Upper Mid-Range SUV	**$ 427,674.47**	**$ 445,968.47**	**$ 487,336.08**	**87.68%**
Acura	NSX	$ 854,887.58	$ 890,145.61	$ 957,048.46	89.33%
M-Benz	SC 430	$ 562,117.77	$ 589,877.03	$ 637,818.82	88.13%
Cadillac	XLR	$ 537,297.97	$ 563,218.07	$ 608,586.69	88.29%
Jaguar	XK	$ 574,954.35	$ 599,692.40	$ 650,714.16	88.36%
Porsche	911 Carrera 4	$ 427,370.16	$ 449,033.39	$ 508,841.26	83.99%
Porsche	911 Carrera	$ 448,989.35	$ 470,159.04	$ 539,024.80	83.30%
M-Benz	SL Coupe/Roadster	$ 453,926.36	$ 474,640.85	$ 531,259.62	85.44%
M-Benz	CL class	$ 476,121.81	$ 496,048.54	$ 550,918.22	86.42%
BMW	6 Series	$ 392,192.84	$ 410,392.10	$ 457,778.56	85.67%
Lotus	Lotus	$ 274,308.29	$ 289,034.02	$ 326,902.41	83.91%
Dodge	Viper	$ 256,791.91	$ 270,697.97	$ 314,090.42	81.76%
	Total Upper Premium Sportscars	**$ 478,087.13**	**$ 500,267.18**	**$ 552,998.49**	**85.87%**
	Industry Straight Average	**$ 461,849.94**	**$ 481,945.34**	**$ 525,122.97**	**93.96%**

On a purely cost per mile basis for energy use from “Dust to Dust” future post-manufacturing technology advances can make a significant difference. For hybrids currently being offered, the CPM variance is around 70 cents. For budget vehicles it is only about 15 cents.

Based on historic technology advances, the probable figure is closer to the minimum than the maximum. Again, all of the information is in the context of today’s marketplace. And the number to use depends on how efficient the industry can become at each of the necessary stages in vehicle life.

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Division	Model	Energy $ Total Minimum Per Mile	Energy $ Total Medium Per Mile	Energy $ Total Max. Per Mile
Kia	Rio	$0.964	$1.010	$1.121
Hyundai	Accent	$0.852	$0.897	$1.013
Chevrolet	Aveo	$0.765	$0.801	$0.905
Toyota	Echo	$0.703	$0.735	$0.827
	Total Budget Cars	**$0.821**	**$0.861**	**$0.966**
Chevrolet	Cobalt	$1.013	$1.056	$1.172
Toyota	Matrix **	$1.011	$1.057	$1.170
Mazda	Mazda3	$0.980	$1.026	$1.140
Nissan	Sentra	$0.962	$1.007	$1.136
Suzuki	Aerio	$0.888	$0.927	$1.050
Mitsubishi	Lancer	$0.872	$0.914	$1.050
Kia	Spectra	$0.864	$0.908	$1.018
Scion	tC	$0.845	$0.886	$1.002
Suzuki	Forenza	$0.840	$0.880	$1.002
Ford	Focus	$0.803	$0.841	$0.942
Mazda	Protégé	$0.772	$0.807	$0.928
Pontiac	Sunfire	$0.758	$0.793	$0.897
Chevrolet	Cavalier	$0.757	$0.795	$0.904
Scion	xA	$0.736	$0.773	$0.864
Toyota	Corolla	$0.732	$0.767	$0.854
Dodge	Neon	$0.728	$0.765	$0.877
Hyundai	Elantra	$0.723	$0.757	$0.869
Saturn	Ion	$0.709	$0.742	$0.845
Ford	Escort	$0.568	$0.590	$0.685
Scion	xB	$0.478	$0.499	$0.597
	Total Economy Cars	**$ 0.802**	**$ 0.840**	**$ 0.950**
Nissan	Xterra	$2.022	$2.103	$2.317
Isuzu	Trooper	$1.909	$1.983	$2.161
Mazda	Mazda5	$1.679	$1.758	$1.904
Isuzu	Rodeo	$1.542	$1.601	$1.791
Suzuki	XL-7	$1.477	$1.545	$1.735
Suzuki	Grand Vitara	$1.414	$1.476	$1.635
Kia	Sorento	$1.320	$1.386	$1.574
Chevrolet	Blazer	$1.295	$1.347	$1.530
Suzuki	Vitara	$1.257	$1.317	$1.492
Isuzu	Rodeo Sport	$1.225	$1.286	$1.449
Kia	Sportage	$1.168	$1.224	$1.380
Jeep	Liberty	$1.099	$1.147	$1.286
Chevrolet	Tracker	$0.694	$0.727	$0.865
Jeep	Wrangler	$0.604	$0.627	$0.804
	Ttl Entry Level SUVs	**$ 1.336**	**$ 1.395**	**$ 1.566**

Mitsubishi	Outlander	$2.266	$2.360	$2.566
Hyundai	Tucson	$2.215	$2.322	$2.523
Mazda	Tribute	$2.212	$2.320	$2.511
Hyundai	Santa Fe	$2.019	$2.121	$2.336
Pontiac	Torrent	$1.974	$2.073	$2.254
Ford	Escape	$1.950	$2.051	$2.248
Mercury	Mariner	$1.948	$2.050	$2.229
Toyota	RAV4	$1.948	$2.041	$2.211
Saturn	Vue	$1.847	$1.927	$2.085
Chevrolet	Equinox	$1.821	$1.900	$2.071
Honda	Element	$1.807	$1.901	$2.081
Pontiac	Aztek	$1.542	$1.614	$1.766
Honda	CR-V	$1.478	$1.550	$1.700
	Ttl Entry Level Sportwagons	**$ 1.925**	**$ 2.018**	**$ 2.199**
Nissan	Titan	$2.691	$2.799	$3.042
Toyota	Tundra	$2.509	$2.620	$2.871
Dodge	Ram pickup	$2.484	$2.589	$2.796
Chevrolet	Silverado	$2.450	$2.538	$2.764
GMC	Sierra	$2.450	$2.534	$2.749
Ford	F Series	$2.392	$2.477	$2.725
	Ttl Full Size Pickup	**$ 2.496**	**$ 2.593**	**$ 2.825**
GMC	Savana/G Van	$2.692	$2.777	$3.036
Ford	Econoline/Club Wagon	$2.686	$2.776	$3.044
GMC	Express/G Van	$2.482	$2.577	$2.800
Dodge	Sprinter Van	$2.420	$2.496	$2.722
Dodge	Ram Van	$2.267	$2.361	$2.589
Ford	Econoline van	$2.195	$2.269	$2.491
	Full Size Van	**$ 2.457**	**$ 2.543**	**$ 2.780**
Honda	Accord Hybrid	$3.295	$3.548	$3.945
Toyota	Prius	$3.249	$3.526	$4.084
Honda	Civic Hybrid	$3.238	$3.480	$3.880
Ford	Escape Hybrid	$3.179	$3.396	$3.832
Mercury	Mariner Hybrid	$3.162	$3.382	$3.812
Honda	Insight	$2.939	$3.167	$3.625
Lexus	RX 400h	$3.953	$4.267	$5.093
Toyota	Highlander Hybrid	$2.744	$2.998	$3.468
	Ttl Hybrids	**$ 3.220**	**$ 3.471**	**$ 3.967**
Volkswagen	Phaeton	$11.213	$11.638	$12.423
Audi	allroad quattro	$5.595	$5.814	$6.264
Audi	A6	$4.963	$5.158	$5.526
Lexus	LS 430	$4.734	$4.908	$5.243
Lexus	GS 430	$4.416	$4.603	$4.903
Infiniti	Q45	$4.243	$4.412	$4.766
Jaguar	S-Type	$3.989	$4.159	$4.514
Infiniti	M45	$3.876	$4.069	$4.405

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Lexus	GS 300	$3.861	$4.076	$4.389
Cadillac	DTS	$3.471	$3.614	$3.830
Cadillac	DeVille	$3.385	$3.508	$3.745
M-Benz	E class	$3.313	$3.419	$3.704
Cadillac	Seville	$3.305	$3.474	$3.731
Volvo	80 series	$3.301	$3.421	$3.670
Cadillac	STS	$3.175	$3.306	$3.540
BMW	5 Series	$3.140	$3.276	$3.483
Acura	RL	$2.762	$2.897	$3.119
Lincoln	Town Car	$2.756	$2.871	$3.125
BMW	M3	$2.727	$2.869	$3.120
	Total Luxury Car	**$ 4.117**	**$ 4.289**	**$ 4.605**
Volkswagen	Golf	$2.697	$2.840	$3.021
Volkswagen	Golf GTI	$2.763	$2.909	$3.134
Saturn	L series	$2.534	$2.642	$2.848
Honda	Civic	$2.420	$2.532	$2.731
Chevrolet	HHR	$2.397	$2.554	$2.789
Pontiac	G6	$2.342	$2.460	$2.670
Chevrolet	Classic	$2.269	$2.361	$2.523
Subaru	Impreza	$2.225	$2.328	$2.535
Pontiac	Grand Am	$2.224	$2.313	$2.486
Ford	Fusion	$2.202	$2.288	$2.447
Mercury	Milan	$2.202	$2.295	$2.477
Dodge	Stratus	$2.165	$2.250	$2.428
Kia	Optima	$1.994	$2.095	$2.261
Hyundai	Sonata	$1.980	$2.064	$2.238
Suzuki	Verona	$1.908	$1.992	$2.168
Volkswagen	Beetle	$1.828	$1.915	$2.069
Pontiac	Vibe	$1.011	$1.056	$1.174
Chevrolet	Malibu	$1.919	$2.013	$2.157
Chrysler	PT Cruiser	$1.612	$1.675	$1.811
Chrysler	Sebring	$1.283	$1.338	$1.476
	Ttl Lower Mid-Range Cars	**$ 2.099**	**$ 2.196**	**$ 2.372**
Nissan	Pathfinder	$2.220	$2.324	$2.559
Toyota	4Runner	$2.193	$2.287	$2.502
Mitsubishi	Montero	$2.177	$2.278	$2.520
Mitsubishi	Montero Sport	$2.123	$2.237	$2.482
Isuzu	Axiom	$1.735	$1.821	$2.015
Land Rover	Freelander	$1.674	$1.758	$1.962
Isuzu	Ascender	$1.531	$1.602	$1.796
Jeep	Commander	$1.531	$1.592	$1.796
Jeep	Grand Cherokee	$1.495	$1.549	$1.735
Jeep	Grand Cherokee SRT-8	$1.698	$1.872	$2.045
Dodge	Durango	$1.429	$1.493	$1.685
Ford	Explorer	$1.404	$1.465	$1.652
Chevrolet	TrailBlazer	$1.363	$1.416	$1.595
	Ttl Lower Mid-Range SUV	**$ 1.736**	**$ 1.823**	**$ 2.026**

Toyota	Sequoia	$3.672	$3.838	$4.144
Nissan	Armada	$3.450	$3.606	$3.929
Ford	Excursion	$3.304	$3.423	$3.712
Chevrolet	Suburban	$3.134	$3.233	$3.488
GMC	Yukon XL	$3.132	$3.245	$3.495
Ford	Expedition	$3.058	$3.159	$3.401
Chevrolet	Tahoe	$2.937	$3.046	$3.271
GMC	Yukon	$2.936	$3.044	$3.290
	Total Large SUV	**$ 3.203**	**$ 3.324**	**$ 3.591**
Chrysler	Pacifica	$2.780	$2.910	$3.134
Nissan	Murano	$2.510	$2.615	$2.795
Toyota	Highlander	$2.490	$2.608	$2.781
Ford	Freestyle/Windstar	$2.481	$2.577	$2.780
Buick	Rendezvous	$2.392	$2.491	$2.690
Honda	Pilot	$2.197	$2.300	$2.504
Mitsubishi	Endeavor	$1.974	$2.078	$2.264
	Total Mid-Range Sportwagons	**$ 2.403**	**$ 2.511**	**$ 2.707**
Volkswagen	EuroVan/T4	$2.294	$2.406	$2.609
Honda	Odyssey	$2.267	$2.354	$2.541
Pontiac	Montana SV6	$2.239	$2.343	$2.541
Chrysler	Town & Country	$2.218	$2.316	$2.506
Buick	Terraza	$2.212	$2.311	$2.514
Dodge	Caravan/Grand Caravan	$2.181	$2.277	$2.451
Toyota	Sienna	$2.180	$2.291	$2.480
Chevrolet	Venture	$2.144	$2.240	$2.452
Saturn	Relay	$2.143	$2.246	$2.432
Pontiac	Montana	$2.142	$2.247	$2.441
Nissan	Quest	$2.118	$2.213	$2.392
Chevrolet	Uplander	$2.117	$2.220	$2.434
Ford	Freestar	$2.069	$2.159	$2.379
Mercury	Monterey	$2.069	$2.174	$2.359
Kia	Sedona	$1.994	$2.092	$2.309
Mazda	MPV	$1.953	$2.039	$2.215
GMC	Safari	$1.725	$1.798	$1.968
Chevrolet	Astro	$1.725	$1.789	$1.980
	Total Minivans	**$ 2.099**	**$ 2.195**	**$ 2.389**
Volvo	70 series	$2.482	$2.595	$2.816
Volvo	60 series	$2.269	$2.382	$2.585
Mercury	Zephyr	$2.196	$2.296	$2.488
Acura	TL	$2.122	$2.222	$2.398
Acura	CL	$2.022	$2.118	$2.305
Lincoln	LS	$2.017	$2.105	$2.297
Jaguar	X-Type	$1.908	$1.995	$2.178
Lexus	ES 330	$1.852	$1.930	$2.103
Lexus	IS 300	$1.833	$1.924	$2.100
Infiniti	G35	$1.777	$1.854	$2.015
M-Benz	C class	$1.699	$1.777	$1.948

Cadillac	CTS		$1.680		$1.756		$1.908
BMW	330		$1.616		$1.683		$1.836
Buick	Park Avenue		$1.556		$1.626		$1.778
BMW	325		$1.531		$1.598		$1.766
Saab	9-5		$1.529		$1.604		$1.758
	Total Near Luxury Cars	**$**	**1.881**	**$**	**1.967**	**$**	**2.143**
Audi	A8		$4.964		$5.152		$5.559
M-Benz	S class		$3.669		$3.795		$4.153
Maserati	Maserati		$3.055		$3.190		$3.603
BMW	7 Series		$2.936		$3.048		$3.304
Jaguar	XJ		$2.785		$2.913		$3.115
	Total Premium Cars	**$**	**3.482**	**$**	**3.619**	**$**	**3.947**
Mercury	Montego		$2.264		$2.371		$2.580
Buick	LaCrosse		$2.245		$2.353		$2.540
Volkswagen	Passat		$2.052		$2.129		$2.292
Dodge	Magnum		$2.019		$2.103		$2.282
Ford	Five Hundred		$2.018		$2.109		$2.289
Dodge	Charger		$1.974		$2.059		$2.242
Nissan	Maxima		$1.966		$2.046		$2.213
Chrysler	300/300M		$1.961		$2.051		$2.235
Mitsubishi	Diamante		$1.932		$2.028		$2.213
Volvo	40 series		$1.897		$1.989		$2.159
Infiniti	I30/I35		$1.851		$1.926		$2.086
Mazda	Millenia		$1.802		$1.897		$2.074
Audi	A4/S4		$1.774		$1.860		$2.065
Audi	S4		$1.894		$2.059		$2.212
Acura	TSX		$1.725		$1.796		$1.945
Saab	9-3		$1.636		$1.709		$1.867
Saab	9-2		$1.553		$1.622		$1.783
Buick	Regal		$1.167		$1.228		$1.366
	Total Premium Mid-Range Cars	**$**	**1.874**	**$**	**1.963**	**$**	**2.136**
M-Benz	SLK class		$3.982		$4.158		$4.490
M-Benz	CLS class		$3.668		$3.809		$4.052
M-Benz	CLK class		$3.492		$3.640		$3.916
Porsche	Boxster		$3.224		$3.375		$3.629
Chevrolet	Corvette		$3.158		$3.305		$3.559
Audi	TT		$2.768		$2.901		$3.091
BMW	Z8		$2.733		$2.850		$3.062
BMW	Z4		$2.483		$2.611		$2.809
Ford	Thunderbird		$1.477		$1.543		$1.714
Chrysler	Crossfire		$1.323		$1.398		$1.576
	Total Premium Sporty Cars	**$**	**2.831**	**$**	**2.959**	**$**	**3.190**
Porsche	Cayenne		$4.146		$4.269		$4.591
Volkswagen	Touareg		$4.134		$4.311		$4.621
Land Rover	Range Rover		$3.775		$3.939		$4.249
M-Benz	G class		$3.711		$3.858		$4.205

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Hummer	H1	$3.505	$3.603	$3.845
Lexus	LX 470	$3.229	$3.367	$3.633
Cadillac	Escalade ESV	$3.197	$3.330	$3.617
Toyota	Land Cruiser	$3.184	$3.279	$3.520
Hummer	H2	$3.027	$3.139	$3.372
Cadillac	Escalade	$2.753	$2.857	$3.092
Lincoln	Navigator	$2.617	$2.720	$2.964
	Total Premium SUV	**$ 3.389**	**$ 3.516**	**$ 3.792**
Volvo	XC90	$3.325	$3.462	$3.715
Lexus	RX330	$3.306	$3.439	$3.700
Infiniti	FX35	$3.029	$3.160	$3.413
Infiniti	FX45	$3.269	$3.421	$3.671
M-Benz	R class	$2.960	$3.101	$3.336
Volvo	50 series	$2.937	$3.079	$3.307
Acura	MDX	$2.845	$2.963	$3.184
Cadillac	SRX	$2.782	$2.914	$3.165
M-Benz	M class	$2.482	$2.579	$2.815
BMW	X5	$2.368	$2.471	$2.691
BMW	X3	$2.264	$2.368	$2.561
	Total Premium Sportwagons	**$ 2.870**	**$ 2.996**	**$ 3.233**
Honda	Accord	$2.180	$2.271	$2.444
Volkswagen	Jetta wagon	$2.046	$2.161	$2.372
Volkswagen	Jetta	$2.016	$2.128	$2.282
Toyota	Camry	$1.954	$2.044	$2.190
Subaru	Baja	$1.909	$1.992	$2.166
Subaru	Legacy	$1.849	$1.931	$2.090
Subaru	Forester	$1.825	$1.912	$2.084
Subaru	Outback	$1.785	$1.926	$2.083
Mazda	Mazda6	$1.796	$1.878	$2.037
Dodge	Intrepid	$1.772	$1.855	$2.037
Chevrolet	Monte Carlo	$1.506	$1.571	$1.713
Mitsubishi	Galant	$1.465	$1.538	$1.682
Pontiac	Grand Prix	$1.465	$1.539	$1.679
Buick	Century	$1.455	$1.516	$1.661
Mercury	Sable	$1.447	$1.505	$1.641
Ford	Taurus	$1.446	$1.506	$1.670
Mazda	626	$1.397	$1.462	$1.631
Nissan	Altima	$1.381	$1.446	$1.589
Chevrolet	Impala	$1.357	$1.413	$1.541
Hyundai	XG350	$1.285	$1.351	$1.507
Kia	Amanti	$1.263	$1.318	$1.482
	Total Small Rid-Range Cars	**$ 1.648**	**$ 1.727**	**$ 1.885**
Chevrolet	SSR	$2.442	$2.558	$2.842
Honda	Ridgeline	$1.807	$1.891	$2.079
GMC	Canyon	$1.283	$1.334	$1.497
GMC	Sonoma	$1.283	$1.338	$1.484
Nissan	Frontier	$1.160	$1.215	$1.372

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Toyota	Tacoma	$1.147	$1.202	$1.346
Chevrolet	Colorado	$1.125	$1.171	$1.341
Mitsubishi	Raider	$1.124	$1.170	$1.326
Mazda	B-Series	$1.088	$1.131	$1.306
Dodge	Dakota	$1.014	$1.058	$1.234
Ford	Ranger	$0.968	$1.013	$1.175
Chevrolet	S10	$0.779	$0.812	$0.945
	Total Small Pickup	**$ 1.268**	**$ 1.324**	**$ 1.496**
Cadillac	Escalade EXT	$2.048	$2.125	$2.348
Chevrolet	Avalanche	$1.978	$2.047	$2.299
Lincoln	Mark LT	$1.944	$2.029	$2.272
	Total Specialty Utility Pickup	**$ 1.990**	**$ 2.067**	**$ 2.306**
Mazda	RX8	$2.482	$2.610	$2.834
Nissan	350Z	$2.193	$2.304	$2.512
Audi	A3	$2.096	$2.200	$2.385
Mitsubishi	Eclipse Spyder	$2.079	$2.195	$2.373
Mitsubishi	Eclipse	$2.021	$2.116	$2.300
Pontiac	GTO	$1.995	$2.098	$2.296
Toyota	Celica	$1.969	$2.064	$2.229
Mini	Mini Cooper S	$1.908	$2.000	$2.157
Acura	RSX	$1.908	$1.996	$2.168
Pontiac	Solstice	$1.880	$1.966	$2.126
Mini	Mini Cooper	$1.795	$1.881	$2.009
Ford	Mustang	$1.758	$1.829	$1.993
Toyota	MR2 Spyder	$1.683	$1.754	$1.912
Mazda	MX-5 Miata	$1.471	$1.535	$1.667
Honda	S2000	$1.455	$1.529	$1.699
Hyundai	Tiburon	$1.439	$1.497	$1.639
Pontiac	Firebird	$1.287	$1.349	$1.518
Chevrolet	Camaro	$1.286	$1.345	$1.514
	Total Touring	**$ 1.817**	**$ 1.904**	**$ 2.074**
Toyota	Avalon	$1.967	$2.044	$2.222
Buick	Lucerne	$1.802	$1.875	$2.031
Pontiac	Bonneville	$1.782	$1.865	$2.043
Chrysler	Concorde	$1.531	$1.599	$1.786
Mercury	Grand Marquis	$1.418	$1.478	$1.618
Ford	Crown Victoria	$1.417	$1.478	$1.616
Buick	LeSabre	$1.372	$1.434	$1.569
	Total Traditional Car	**$ 1.613**	**$ 1.682**	**$ 1.841**
Maybach	Maybach	$11.582	$11.949	$12.759
Rolls-Royce	Rolls-Royce	$10.660	$11.036	$11.657
Bentley	Bentley	$10.555	$10.912	$11.528
Porsche	Carrera GT	$4.528	$4.721	$5.216
Lamborghini	Lamborghini	$4.009	$4.223	$4.779
Ferrar	Ferrari	$3.962	$4.187	$4.860
Ford	GT	$3.851	$4.073	$4.687

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Aston Martin	Aston Martin	$3.028	$3.165	$3.492
	Total Ultra Luxury	**$ 6.522**	**$ 6.783**	**$ 7.372**
Lexus	GX 470	$2.686	$2.800	$3.036
Land Rover	Discovery	$2.525	$2.619	$2.861
Land Rover	LR3	$2.489	$2.580	$2.828
Infiniti	QX4	$2.483	$2.609	$2.848
Land Rover	Range Rover Sport	$2.420	$2.525	$2.746
Lincoln	Aviator	$2.347	$2.443	$2.675
Mercury	Mountaineer	$2.336	$2.438	$2.683
Subaru	B9 Tribeca	$2.240	$2.345	$2.570
GMC	Envoy	$2.196	$2.281	$2.500
Buick	Rainier	$2.180	$2.282	$2.471
Saab	9-7X	$2.169	$2.279	$2.512
Hummer	H3	$1.949	$2.034	$2.221
	Total Upper Mid-Range SUV	**$ 2.335**	**$ 2.436**	**$ 2.663**
Acura	NSX	$4.453	$4.636	$4.985
M-Benz	SC 430	$3.407	$3.575	$3.866
Cadillac	XLR	$3.276	$3.434	$3.711
Jaguar	XK	$3.058	$3.190	$3.461
Porsche	911 Carrera 4	$2.830	$2.974	$3.370
Porsche	911 Carrera	$2.738	$2.867	$3.287
M-Benz	SL Coupe/Roadster	$2.686	$2.809	$3.144
M-Benz	CL class	$2.533	$2.639	$2.930
BMW	6 Series	$2.267	$2.372	$2.646
Lotus	Lotus	$2.267	$2.389	$2.702
Dodge	Viper	$2.176	$2.294	$2.662
	Total Upper Premium Sportscars	**$ 2.881**	**$ 3.016**	**$ 3.342**
	Industry Straight Average	**$2.481**	**$2.592**	**$2.830**

CHAPTER 15 – Conclusion

To be quite up front, there is no actual conclusion to this study. It is, hopefully, only a beginning of a discussion about the social cost of energy.

Just as an example of some of the issues future reports from other sources and investigators must consider include those already pointed out in this report but should increasingly note the small items in the calculations. Just a few:

- The type of material used other than major panels or understructures have important impact (albeit seemingly small overall) such as chrome. It is one of the most difficult and expensive to make and dispose of. The pollution and clean-up cost for such material far outweigh its seemingly insignificant contribution to a vehicle's appearance or cost.

- "Manufacturing" must include suppliers and the design, development and manufacture of support machinery, not just the use of those machines. Human labor is far less energy intense than a robotic milling machine, even though there are clear cost advantages when replacing human labor with robotics.
- Dies, molds and related equipment are more complex for more technologically advanced vehicles. This can be the difference between a Maybach and a Sonata or between the Scion xB vs. the Scion xA. More bending, more components, more cost.
- Some portion of the worker transportation to and from work at all levels of the auto design/develop to disposal can be a critical component in the overall energy expense. This relates in part to where those manufacturing plants are located be it in China or Tennessee and what the infrastructure demands are to support that manufacturing plant. (Note: CNW used a 22 to 46 percent range of employee transportation costs related to the individual models based on actual surveys of what portion of total driving is specifically for work and adjusted for the fact that worker would obviously be employed somewhere else if not at the car plant.)
- Autos are fully a quarter-plus of all items disposed of in the U.S. as a share of energy expended to recycle, re-use and/or dispose of non-recyclable components and material.
- To sell 17 million vehicles the auto industry needs roughly 45 million shoppers or intenders. No evaluation except this one has included that calculation in the overall energy cost of a single automobile.

While we could expand on this for pages, the real conclusion is that there are many other factors involved than the simple "fuel economy" cost that most consumers believe is the true measure of a vehicle's efficiency.

For environmentalists and those concerned about CO2, for example, the adage that this emission knows no (national) borders is not only true but important to the discussion about pollution, global warming or related topics. And that leads back to the ability of an automaker to produce simplified vehicles, the ability of the recycle/disposal industries to increasingly more efficient means of using those vehicles at the end of their lives.

For government agencies, a serious consideration of the global impact has to be addressed when deciding on a local regulation regardless of the final decision.

For automakers, it is important to consider all aspects of energy consumption and how this important social product impacts society in general.

For other researchers into this topic, we would recommend adding as many factors as conceivable to their evaluations to better understand the overall impact.

For CNW, it means continued refinement of the data whether it results in significant alternations in methodology or how the data is reported. We welcome comments, criticisms, suggestions and recommendations for a better way of reporting the findings. We expect to continue on this path for some time into the future.

In the following pages we have two sections:

The **Q&A** includes letters, emails and (yes) faxes that responded to our initial releases. Some of those letters answer general questions asked; others include discussions or links to previous manufacturing studies.

The **Appendix** section similarly includes news articles about gasoline, ethanol and other somewhat or precisely related topics.

We recommend spending the time to at least scan these posts and articles. We found them helpful in focusing our future Dust-to-Dust energy reports which we believe will be issued annually.

Q&A

Over the past couple of months we have received literally hundreds of emails related to this research.

Below are *__just a few__* of those emails including questions and names of organizations that have commented on or requested additional data. We answered all of these emails and the responses are included.

Question: Is the solution (to the energy issue) converting diesel to bio-diesel? Which of the cars on your list are diesel? Should we do what Europe is doing in the area of diesel?

Answer: The simple answer is yes and no. Part of the EMISSIONS solution would be to convert to bio-diesel, but the added energy cost of producing the useable bio part is higher than the energy required to produce the equivalent amount of diesel. This goes for clean bio and/or reusing (for example) restaurant leavings. This may change as technology advances, however.

One of the problems the European model has is that they are trying to buy clean bio because it is less expensive to produce than converting existing or cast-off bio.

Proving, once again, that there are consequences to every action, suppliers of clean bio are, in part, in South America and to produce the crops necessary for fresh bio they need to cut down forests (some of which are rain and old growth) in order to clear the land and plant the necessary crops. As demand for clean bio to add to diesel increases, so does the "necessity" to clear forested areas.

One once could have used the U.S.'s excess grains (of which, you may recall, we had plenty). The problem is that the U.S. now grows about as much grain as is used for food with little if any excess. (Remember grain banks?)

Question: A vehicle that gets 45 mpg average. 150,000 (miles) = 3,333 gallons consumed.

A vehicle that gets 22 mpg, 150,000 miles = 6,818 gallons.

Difference: 3,485 gallons. That’s a lot of gas.

Are robots using that much energy to make one car?

Lets suppose you don’t have all those people driving to that workplace if robots are working?

And the mining of the additional metal that goes into a heavier vehicle?

Are the lighter vehicles using a refining or smelting process that is detrimental?

Answer: There is more than just gas or manufacturing involved in the calculations. The energy needed to generate the extra 3,000 gallons of gasoline is far less than the added energy needed to 1) build the vehicle; 2) dispose of the added hardware (such as motors and batteries); 3) recycle the materials used such as aluminum, light-weight steel, etc.

I know you're resisting this and I understand completely. Some of my reactions were similar. But the reality is simple: To produce a more technologically advanced product requires a higher degree of both automation and expensive materials. To dispose of that same vehicle requires more technology and higher costs for recycling (among many, many other factors).

Your point about driving to work is noted and has been included in the calculations. Those same people are still driving to work, just not to an auto plant.

Also note that it requires energy to design, build, use and dispose of robots (included on our data points).

NOTE: THIS WAS FORWARDED TO CNW. THE QUESTION WAS POSED TO 'GOOGLE ANSWER'

While we agree in large part with the answer, it clearly leaves much of the calculations out of the energy-use equation. It does make some interesting points. (CNW comments are included in "bold, italic.")

Question: Subject: **Energy required to manufacture typical vehicle**
Asked by: **iota-ga**
Question ID: 433981

In order to move a vehicle to retail sale a great deal of energy is consumed. Some of the consumption points are the mining of the raw materials, the petroleum processing to produce the plastics and running the plant where the vehicle is assembled.

I would like more than one (and independent) source of the total energy required to produce a typical (say, Ford Crown Victoria car, F-150 truck or E-150 van) vehicle ready for retail sale.

Extra, related information related to the environmental impact is a plus and runs to a tip (which can easily exceed the initial price).

Government sponsored research or (other research) that (is) obviously distanced from the car manufacturing industry is a plus. Energy-related information related to the end-of-life expenditures (i.e., what does it take to reduce the vehicle to reusable parts) is likewise a plus.

For example, one search strategy... energy (require OR consume) manufacture (car OR auto OR automobile OR vehicle) produced the informative link http://www.ilea.org/lcas/macleanlave1998.html. Please don't include this study in the results.

FOLLOWING IS THE GOOGLE ANSWER TO THIS QUESTION including CNW's comments where appropriate or can expand on the answer.

Subject: **Re: Energy required to manufacture typical vehicle**
Answered By: **siliconsamurai-ga** on 16 Jan 2006 11:58 PST

Hi, thank you for bringing your question to us here at Google Answers.

Much less energy is used to manufacture a vehicle than is used by the vehicle during its useful lifetime so a small improvement in fuel efficiency would have a significant impact on the energy footprint of the motor vehicle industry.

What you are looking for is what is known as a life-cycle energy analysis (you probably already knew that.) Please bear in mind that with all the variables involved there are no really specific answers, but the averages are well understood and most reports seem to vary by only a few percent on the important points.

You said you didn't want any references to the Institute for Lifecycle Energy Analysis, presumably because you are already familiar with their work, so I left out any www.ilea.org links and didn't search any of their pages, if there is work here which duplicates their information that is mere coincidence, I used different sources.

To get your initial question out of the way fast, it takes about 73 Giga-Joules of energy to manufacture a vehicle. This is less than 10 percent of the total lifecycle energy consumption of a vehicle. See the detailed explanation and calculation below, along with information about fuel energy consumption and recycling costs and links to
detailed energy costs of various vehicle materials.

(Note: There are no calculation in any of aforementioned articles related to the energy requirements for supplier industries. Nor are there references to design and development of models.)

Some of the information below addresses the topic directly, other links are more environmentally oriented, and still others are included because they show similar results and therefore support the main source, a government analysis from the Argonne National Laboratory.

A California-oriented paper
http://www.environmentaldefense.org/documents/3986_CAautocarbonburden.pdf states that direct tailpipe emission of CO_2 accounts for 68% of the average vehicle lifecycle carbon

emissions, with 21 percent linked to production and delivery of fuel, and 11 percent are due to manufacturing, including materials production.

Ford Motor Company
http://www.ford.com/en/company/about/corporateCitizenship/report/principlesEnvironmentPerformanceAspects.htm states that an average Taurus class family sedan in the 1,500 kg weight range (which would be similar to a Ford F-150 pickup) has a total lifecycle energy consumption of 961 GigaJoules, 21,000 kb of hydrocarbons are consumed, and 60,000 kg of carbon dioxide are emitted.

That is based on a vehicle mileage life of 120,000 miles.

Ford's report (which is cited by some environmental groups so it is probably pretty accurate) also specifically addresses environmental concerns.

There is a 73-page report on the carbon impact of automakers at
http://www.its.ucdavis.edu/events/outreachevents/asilomar2005/presentations/DeCicco.pdf

There is a report on automaker rankings at
http://www.calcleancars.org/resources/UCS_Auto_Rankings_2004.pdf

This is from the Union of Concerned Scientists
www.ucsusa.org

(CNW Note: The issue of carbon dioxide is part of the discussion, but not in CNW's report. The Ford report is older and relates to Taurus. The F150 comparison is a false one because it is a distinctly different vehicle in both design and platform. The Taurus replacement – whether considered the Ford 500 or the Fusion – is significantly more complex than Taurus and requires dramatically more energy to design, develop, build, use and dispose of. The GigaJuoules reference above is off by a factor of 1.53.)

This is mostly related to average new vehicle carbon emissions and shows that Honda is always at the top. I include this only because of the very large percentage of lifecycle energy consumption which is due to operation of the vehicle.

(CNW Note: The term "lifecycle" is not an accurate one in this regard, although it was as good as available at the time.)

There is a very detailed report on Lifecycle Energy Savings Potential related to increased use of aluminum in vehicles at http://www.transportation.anl.gov/pdfs/TA/106.pdf

This report is from the Argonne National Laboratory and looks at both existing vehicles and proposed light weight aluminum vehicles.

Page 7 begins coverage of energy production for production and recycling.

This starts by explaining that while lighter cars use less fuel to run, the materials involved may require more energy to produce in the first place.

The total energy for production of virgin (mined and refined, not recycled) sheet steel is about 65 Megajoules/kg and recycled steel costs are a bit less at 52 MJ/kg.

Thus, recycling won't have a major impact on energy savings, although it can have important beneficial consequences for the environment.

For cast iron (engine blocks and suspension parts) the cost is about 37MJ/kg for what is known as gray iron castings with most energy consumption going to coal and coke production. Cast iron, as the report states, is mostly made from recycled material anyway.

The story is very different for virgin sheet or wrought aluminum which uses 231MJ/kg to produce but only 52 MJ/kg to recycle.

The environmental impact of virgin aluminum production is not proportional to the raw energy consumption during manufacture since a lot of comes from hydroelectric generation (20%) which produces no direct carbon emissions, although it does produce heat pollution and hydroelectric dams can have huge environmental impact. A significant percentage of the aluminum energy consumption comes from coal.

There are specific numbers in this report which will let you calculate various environmental impact parameters from altering vehicle composition or material sources.

Cast aluminum, like cast iron, comes mostly from recycled metals and only consumes about 44MJ/kg.

Page 9 of the report initiates the coverage of assembly and recycling energy.

One estimate cited is that it takes about 3.8MJ/kg to recycle a vehicle and the report attributes about one-third of this to electricity. Environmental impact will depend a lot on the source of the energy used in recycling.

The Argonne National Labs study also estimates the primary consumption of energy in the lifecycle of a mid-sized passenger car (about the same weight as the full-sized Ford pickup you mention) at 867GJ of primary energy as fuel (gasoline).

Manufacturing and recycling costs for assembly as well as materials production are about 79 GJ, or about 8 percent of the direct engine fuel consumption.

****

PLEASE NOTE, HERE IS THE SOURCE OF THE ANSWER TO THE ACTUAL QUESTION YOU INITIALLY ASK, 79GJ of energy to manufacture AND recycle a vehicle at the end of its useful life. The recycling cost is about 3.8MJ/kg times 1500kg vehicle weight or 5.7GJ. That makes the total manufacturing cost for an average passenger vehicle or consumer-type truck about 73GJ.

For a vehicle using a lot of aluminum to reduce weight by about 19 percent, the total fuel consumption for the vehicle lifecycle is about 759 GJ, or 12.5 percent less energy consumption.

The energy used in manufacturing and recycling is about 66 GJ or 9 percent of the fuel consumption.

The report concludes that the intensive use of aluminum to reduce weight could reduce fuel usage by about 15 percent and that the increased amount of energy required in manufacturing and recycling isn't especially relevant since that is only about 1/10th the total lifecycle energy consumption of a hydrocarbon fueled vehicle.

Reading between the lines, using aluminum in the cast components such as the engine, reduce weight significantly, hence reduce fuel consumption, and consumes very little energy in manufacturing because cast aluminum only costs about 15 percent more in energy consumption than cast iron and weights far less.

The report also includes a chart showing the average material content in U.S. built passenger cars and aluminum intensive vehicles as well as production and recycling energy consumption for automotive materials.

Another chart breaks down the source of energy for the various materials into coal, oil, natural gas, electricity (including hydroelectric percentage.)

Depending on exactly what information you want, the charts in this report will let you calculate the energy involved in each vehicle broken down by every material class which would let you estimate energy savings from increasing or decreasing the percentage of various components included in the vehicle design.

When it comes to environmental impact, overseas production of materials or vehicles could have a significant impact since many other countries derive a much larger percentage of their energy production from nuclear power plants.

(CNW Note: Our study shows that supplier industries, however, are under significantly less stringent emission and effluent regulations. This is especially true in emerging industrialized countries or where limited production is the norm. Additionally, energy requirements for pollution control are significantly higher – by a factor of 8 – in the U.S. vs. China; 0.8 for Germany; 1.9 for Italy; 6.3 for Mexico and most South American facilities; 7.1 for most Eastern European countries.)

I have also provided a considerable amount of information about the actual carbon emissions involved which can be quite different from the total energy consumed because different materials will rely on different energy sources.

You can find CO2 and lifecycle energy consumption data for Toyota vehicles, both fuel cell and gasoline, at
http://www.findarticles.com/p/articles/mi_m3012/is_2_185/ai_n12937459

Fuel Cell vehicle carbon emissions
Fuel production 54 percent
Vehicle production 13 percent
Material production 32 percent

Gasoline vehicle carbon emissions
Driving 72 percent
Fuel production 8 percent
Vehicle production 6 percent
Material production 12 percent

A Joule is one watt per second of energy consumption or about one-quarter of a calorie.

A 60 watt light bulb uses 60 Joules of energy.

A Joule is about equal to three-quarters of a foot pound.

1055 Joules equal one BTU (British Thermal Unit)

For further reading see

Electric and Gasoline Vehicle Lifecycle Cost and Energy-User Model,
April 2000 (278 pages).

ABSTRACT:
The design and lifecycle cost model designs a motor vehicle to meet range and performance requirements specified by the modeler, and then calculates the initial retail cost and total lifecycle cost of the designed vehicle. The model can be used to investigate the relationship between the lifecycle cost -- the total cost of vehicle ownership and operation over the life of the vehicle -- and important parameters in the design and use of the vehicle.

http://web.archive.org/web/20041115093705/repositories.cdlib.org/cgi/viewcontent.cgi?article=1001&context=itsdavis
http://web.archive.org/web/20050223084732/repositories.cdlib.org/itsdavis/UCD-ITS-RR-99-4/

The role of energy in manufacturing
http://www.industrialefficiencyalliance.com/documents/NAM.pdf

If it is of interest, you can find a presentation about lifecycle assessment procedures at
http://www.utexas.edu/research/ceer/che302/greenproduct/dfe/PDF/Streamlined_LCA.pdf

There is no data here. This is just a lesson in how to apply lifecycle analysis.

I believe this research provides answers to all of your questions, if you think something is missing, please post a request for clarification but bear in mind that I can only post so much of the original data here I have cited hundreds of pages of scientific reports which contain many additional details.

Thank you for bringing your question to Google Answers.

> Clarification of Answer by siliconsamurai-ga on 17 Jan 2006 15:24 PST
> Hi, not really a clarification, just additional information which has only become available and which I thought would interest someone who asked about the environmental impact of vehicle production.
>
> The environmental aspect of such topics is extremely complex and just became much more so in the past few weeks when Nature published reports which go counter to everything environmentalists have been calling for.
>
> As summarized on page 13 of the January 13 issue of Financial Times, It has only recently been discovered that trees are responsible for generating up to 30 percent of atmospheric methane, a hydrocarbon which contributes much more per pound to global warming than CO2.
>
> In addition, power plants which spew out CO2 also produce aerosols in large quantities and it turns out that these go a long way toward countering the global warming contributed by the power plant.
>
> There is also very bad news for hydropower which is new late last year.
>
> If you would like more on this topic, let me know by posting another question to my attention.
>
> BTW, I operate an organic ranch/farm and am big on conservation, the news I cited in this note is not anti-environmental, it is just the most recent science.

Answer: We, too, have seen these reports and in part were the reason for our study. For example, none discuss the transportation energy needed to get a Prius from Japan to the U.S., for example (and only one of hundreds of calculations). There is talk of "life cycle" of a vehicle, but little (if any) on the added expenses or energy required for post life cycle disposal.

Note, too, that the dates for some of this research is old in terms of technology at plant, mining and refining operations. Our data is as of 2005, updated in January.

QUESTION: Automobiles: Manufacture vs. Use

Carnegie Mellon University, 1998

This life-cycle inventory of impacts due to the manufacturing and use stages of an automobile was published by Heather L. MacLean and Lester B. Lave of Carnegie Mellon University, in 1998.[1] Maclean and Lave used a method of life-cycle assessment (LCA) known as economic input-output (IO) analysis. This method of LCA has the benefit that it allows the researcher to easily trace the environmental impacts of a car purchase not just through the automobile manufacturing industry, but in turn through its various suppliers (of raw materials, parts, chemicals, etc.)

The drawback of the method is that it relies on national-average data for most impacts, and cannot provide detail about the reasons for specific impacts. MacLean and Lave analyzed a number of different environmental impacts over the life-cycle of the car.

In all cases, they chose not to analyze environmental impacts from the recycling and disposal stage, because they agreed with earlier studies indicating that the environmental impacts of manufacture and use greatly outweighed those of disposal.

They based their analysis on a 1990 Ford Taurus, assuming a vehicle lifetime of approximately 14 years and a fuel efficiency of 21.8 mpg.

Figure 1 shows the distribution of energy use over the manufacturing and use stages. The entire manufacturing stage is represented by the slice "Manufacture," which accounts for 10% of the car's total energy impact.

The remaining four slices comprise the use stage, 90% of the total energy impact. "Fuel" indicates the energy in the gasoline or diesel fuel used to drive the car. "Fuel cycle" indicates the energy required to extract, refine, and distribute the fuel. "Service" represents the parts and labor required to keep the car working for fourteen years.

"Insurance" represents the energy consumed by the offices and services of insurance companies that support car owners.

(Note: This study did not look at the support costs for infrastructure; supplier energy requirements for the manufacture and use of plant machinery including robotics, transportation energy costs for employees (both plant and company support) or other significant energy uses.)

[Focus] Energy efficiency - less is more

21.03.2006 - 14:04 CET | By Helena Spongenberg

EUOBSERVER / ENERGY FOCUS - In an attempt to slow the growing demand for oil and gas and to reduce greenhouse gas emissions, the EU is aiming to better use the energy it already has.

Sixty billion euro could be slashed from the EU energy bill every year and the 25-member bloc could save one fifth of its energy consumption by 2020 if the EU were to become more energy efficient, according to the Commission, which is due to publish a paper on the issue next month

Being more efficient with the resources the EU already has is one way favoured by environment organisations, who warn greenhouse gas emissions in the EU are on the increase and will continue to rise unless member states take preventative steps.

"So many people talk so much about renewable energy as if it was the solution to all of this but the first thing we have got to do is to stop wasting the energy that we've got," says John Goodall of the European Construction Industry Federation (FIEC).

There is one area where huge steps could be made in energy efficiency of the building and housing sector, which alone accounts for 40 percent of EU energy requirements.

But despite member states agreeing on a directive on the energy performance of buildings over 1000 square metres, experts say it is not enough.

Speaking at a Brussels conference on energy management, earlier this month, Mr Goodall said the building directive was just an "enabling measure."

"But in terms of actual energy efficiency, there is nothing in it that obliges anybody to do anything to improve energy efficiency in a building," he added.

Katrien Prins responsible for energy efficiency in the European Commission conceded that it is up to member states themselves to be proactive in the area and take political responsibility for energy efficiency.

"Minimum energy efficiency requirements are very much an obligation and it is for the member states to take responsibility and be serious about this directive," she said at the same conference.

But it is not just lofty policies dictated from above that will ultimately make a difference to the environment Much of it depends on citizens being persuaded to change their high-energy-consumption lifestyles.

Citizens and their environment
For its part, the commission recommends a carrot and stick policy where governments or local

authorities offer subsidies or tax incentives to consumers if they buy products, such as an energy efficient fridge or car.

Another way of making citizens notice how much energy they use would be a tax for wasted energy, suggests Mr Goodall, but admits that it would be difficult to find a way to impose such a tax.

In London, drivers with cars on alternative fuel, such as hybrid cars, do not have to pay the city’s congestion charge paying only an annual registration fee of £10.

The industry is also starting to take energy efficiency more into account. Car makers, for example, are increasingly improving their vehicles, manufacturing more environment(ally) friendly and energy efficient cars.

The main energy-saving feature of the Japanese Toyota Prius car is that it recharges its batteries by capturing the energy usually lost when the car brakes.

(CNW Note: This is overly stated and a common misconception or misrepresentation. The primary source of recharging the batteries is from the gasoline powerplant. Re-generative brakes cannot fully recharge hybrid or fully electric vehicle batteries alone.)

The company itself cut energy consumption for car manufacturing worldwide by 35 percent since 2001 by improving ways of using energy.

(CNW Note: Much of this savings was offloaded to supplier companies through modular construction techniques.)

But experts are generally agreed that even if policies are slow to work or to be taken on board, the facts will soon dictate a lifestyle change as oil and gas prices rise and import dependency on third countries is set to rise to 70 percent in the next 20 years.

Answer: As I mentioned, there is more than just gas or manufacturing involved in the calculations. The energy needed to generate the extra 3000 gallons of gasoline is far less than the added energy needed to 1) build the vehicle; 2) dispose of the added hardware (such as motors and batteries); 3) recycle the materials used such as aluminum, light-weight steel, etc.

I know you're resisting this and I understand completely. Some of my reactions were similar. But the reality is simple: To produce a more technologically advanced product requires a higher degree of both automation and expensive materials. To dispose of that same vehicle requires more technology and higher costs for recycling (among many, many other factors).

Your point about driving to work is noted and has been included in the calculations. Those same people are still driving to work, just not to an auto plant.

Question: I'm a little mystified why you included the Escort, which Ford hasn't offered in North America in several years, but excluded the Escape Hybrid, introduced a couple of years ago. (My son has one and loves it.)

Answer: The Escort was included as a test-bed or benchmark vehicle.

Question: When you list "Maybach," do you mean any particular model? I believe they sell two.

Answer: Because of the limited production, we've included all versions sold in the U.S. under a single heading.

Question: Wow, that's very interesting stuff. I run a website, theWatt.com. Can I post the 3 attached figures to the website? I will give CNW Marketing Research full credit with a link to your website and make it clear that the full report will be available soon. I think many people would be interested in this information.

Also, why would a big car like the Hummer H3 be less energy intensive than a smaller car like the VW Golf? Obviously fuel efficiency has little to do with overall energy consumption. Are there big differences in manufacturing efficiency?

Answer: Production efficiency doesn't necessarily translate into energy efficiency. For example, the more robotics used to produce a vehicle, the more energy is required than using human labor. (This includes the manufacturer, use and disposal energy requirements for each robot.) The savings in overall wage and benefit costs is only partially offset by higher energy costs. The more sophisticated the powertrain, for example, the more energy intense it is to produce.

Gasoline or fuel usage during the life of a vehicle is an important component, but we're looking at the entire cost of energy and its pollution coefficient to society. For example, driving a Prius in Los Angeles does wonders for cleaning the air in the smoggy LA Basin, but in so doing, it exports pollution to Japan where the higher energy usage generates more smokestack discharge. Conversely, manufacturing Camry to the U.S. exports Japanese pollution to the U.S.

I suspect this type of analysis has been sporadic, at best, in the past because of the complexity of measuring supplier (for example) contributions to energy usage.

Question: As General Manager of Land Rover Portland for more than ten years, I have long followed your research on our industry. A few years back I had the pleasure of attending your talk to the Metropolitan Portland Auto Dealers group where you discussed your findings on the shopping patterns of auto buyers. Today I am particularly interested in your most recent study, which identifies the total energy costs over a vehicle's lifetime, and illuminates the fact that hybrids are far less efficient from an environmental standpoint than most people think. Your research quantifies my suspicions on that subject.

As a businessman and as a citizen, I am very concerned about our environment. Under my leadership, Land Rover Portland became the first auto dealership ever certified as an Eco-Logical Business by a multi-agency program in Oregon. Over the years, I have aggressively lobbied Land Rover North America to bring more efficient vehicles to the US market. My voice has been so persistent that Richard Beattie, LRNA's Executive VP of Sales & Marketing, now frequently refers to me as "Diesel Dan".

While I don't appreciate that moniker, I really do believe that new-technology 'clean-diesel' powered vehicles could potentially play a big role in improving the efficiency and environmental impact of the US vehicle fleet – especially in heavier vehicles like SUVs. In Europe, 90% of all Land Rovers sold are diesel-powered. The company's new 2.7 liter V-6 diesel is one of the most advanced 'clean-diesel' engines in the world. It is quick, quiet, and virtually smoke-free, emitting far less greenhouse gas emissions than a comparable gasoline engine. Why, you might ask, does Land Rover not offer this remarkable engine to the US market?

The answer is a complex combination of factors, but among them has been the US media fascination with hybrid power. Over the past few years, the American public has been inundated with positive, non-critical hype regarding hybrid vehicles. During the same time, the same media has completely ignored the vast improvements in diesel technology that have occurred. Most people have no idea how good these new diesels are or that they can return virtually the same fuel economy as hybrid without the complexities and long-term liabilities. Rather, most Americans still perceive diesels to be slow, noisy, smelly and dirty. A small-volume company like Land Rover is understandably nervous about swimming against this sea of public perception.

Also, a very significant part of the US market has been declared off-limits for these new-tech diesels. Some environmental groups are opposed to the new clean-diesel technology because it would have the effect of encouraging US public acceptance of SUVs, while they would rather ban them completely. Those interests have successfully lobbied to ban all diesels in California (and five other states) by purposely setting the standard for particulate (a non-greenhouse gas emission) just below what is achievable with current diesel technology – even though clean-diesels emit at least 30% less greenhouse gasses (with at least 30% more fuel efficiency) than comparable gasoline engines.

It seems to me that your work to identify the *total lifetime cost* of energy consumption could potentially change the entire landscape of this debate. While it was not contained in the press release that I read, I am wondering if there is anything in your study that might shed light on the potential energy cost efficiency of clean diesel. I would appreciate any information you can provide.

In the mean time, congratulations and thank you for your good work!
Cheers,
Dan Muggli
Land Rover Portland

Answer: The subject of overall energy use is one we plan to pursue enthusiastically for the long haul. Clean diesels are part of the solution in terms of Dust-to-Dust energy usage and you can expect a breakout of the data soon.

I concur with your assessment of the media's attachment to hybrids, but based on the phone calls I have received since issuing the release, there are many -- in many countries -- who are not as skeptical of the results as I originally thought would be. In fact, I have one reporter in New York who is a rabid environmentalist who grilled me on the entire subject over the course of nearly a dozen phone calls and emails. She admitted today that she has given the subject a lot of thought and has moved more in your direction than she has ever been.

We struggled with how to show the data in a way that consumers and especially reporters could understand and made sense. Thus the reason for putting the data into an "energy per mile" format.

I believe the next stage for us is to break out "pollution-generated per mile over the Dust-toDust time frame for each vehicle." That will wait until we get a broad awareness of the energy data.

Question: To Whom It May Concern at CNW Marketing Research,

I am absolutely shocked at the pathetically transparent and outright ridiculous results of your most recent study.

How can the lifetime energy cost of hybrid vehicles be calculated, when the first generation of them is nowhere near the end of its life cycle? What about the battery-recharging systems present in all hybrid vehicles? What affect does that have on the number of batteries that need to be disposed of? Where is your evidence? What are these findings based on? Did Toyota and Honda volunteer all of their negative predictive forecasts to you, so that you could attempt to discredit them through this f****** joke of a report? If I'm out of line, please set me straight, because your study has made me question some concrete facts that I can support with equally concrete evidence.

If you want publicity for your farce of a company, thinking that you're going to gain life-changing exposure by throwing stones at a giant - you've got the wrong idea. Hire some porn stars to run down the streets of North America's most populated cities, covered somehow with your company name, if you want to capture the mind space of consumer America. That would generate the exposure that you are seeking, without attracting negativity (which I hope you've taken away from this e-mail, which I personally consider to be little more than a slap on the wrist) rebuttles like this one.

Don't underestimate consumers' interconnectedness today. There exists a web of online commentary today that can cut down ambitious companies in no time. Before you invest the time and effort into creating something like this again, please think twice - nay! - thrice! Because consumers like me, who are good-willed at heart, can turn on you like you in seconds, like I did -

when I read your transparent study. That being said, please send me your evidence, if you wish to shut me up. I welcome it.

Cheers,
Hunter J Moyes

Answer: Hunter...

Thank you for the response and comments.

First, and foremost, we have been in business for more than 20 years and have an excellent reputation among the media, government agencies and many environmental groups. If you wish to discuss the topic, please feel free to address and frame your issues and concerns rather than reverting to foul language.

Second, our concern about the environment is deep and consistent and beyond the simple fuel economy discussion. The cost to society for all energy used rather than the amount of oil needed to drive those vehicles is far more important.

Third, this was not a rebuttal to anything as far as I am aware. We have done many energy, environment and related studies over the past 20 years including a number for some environmental groups. We are independent, fund our own research and have had over the years clients and subscribers in all categories from government agencies (including the California ARB), industry, financial institutions and advocacy groups in eight countries.

Again, however, we never do research FOR anyone. It is always done independently at our own expense.

As for "shutting you up," I believe you have a right to say whatever you wish. You sound like someone who could add to the discussion rather than merely drawing lines in the sand. My interest is in having folks address the issues in an adult fashion. Below is an email from someone who probably finds the information disturbing, as you do, but who had the good sense to write with an analytical, rather than an argumentative, tone.

Since you feel it necessary to go "online" with your views, please feel free to do so. Note, however, that anyone who is interested in truth rather than perceptions, reality vs. wishes, clarity instead of myopia, conversation instead of blind rage, can and is encouraged to send legitimate questions which we will answer as thoroughly as possible. If the data is incorrect or if some of our calculations or assumptions are not accurate, we are more than willing to re-address the issue. Anything less would be a crime against society.

Warmest regards,
Art Spinella
President
CNW Marketing Research, Inc.

Question: I just read an article online at the US News and World Report website quoting research your organization performed to determine the environmental impacts of Hybrids and other cars in the long term etc. I was hoping that you could provide me with a list of a few more of the parameters that you considered than were published on their site...or the whole shebang, I won't complain! Sincerely, Ed

Question: Dear sir,

A press release has been issued today in the UK about your research into the total energy cost of cars, particularly your claim that hybrid cars use more energy per mile than conventional cars.

As this is based on the US market I wondered why it was released in the UK, but more importantly how we can get some more detail on the methodology used to compile the report?

Best regards,
Scott Brownlee
General Manager, Press & Public Affairs
Toyota (GB) PLC
Burgh Heath
Epsom
Surrey
KT18 5UX

Answer: Over time we will release similar data for Europe.

Question: Dear CNW,
I would be grateful if you could confirm how the 2-year programme your release of this week refers to was funded. I have reported it on www.autoindustry.co.uk (on 3 April).

Thank you in anticipation

Toby Procter
Director
Trend Tracker Limited
The CIL Building, Corsley
Warminster, Wiltshire
BA12 7QE, United Kingdom

Answer: The research was fully funded by CNW Marketing Research, Inc. It was done without foreknowledge of any industry-related organization, company or group and is part of our ongoing look into alternative transportation and environmental issues.

A full report will be issued in a couple of weeks. I would be happy to send it along when completed. In the meantime, I don't know what you have already seen, so I am sending along an Excel spreadsheet with all of the vehicles included and related documents that have been released.

Question: Hi-

I tried calling your offices, as instructed in your press release on energy consumption for hybrid vehicles, but there was no answer. I would very much like to have the list of vehicles and their energy costs per mile you describe in the release.

I plan to report on this information in the automotive and transportation industry publications Hybrid & Electric Vehicle Progress and AltFuels Advisor.

Additionally, would it be possible for Mr. Spinella to answer a question? -- Are there any mitigating factors that would influence your conclusion? For instance, do you take into account Europe's activities and aims in the efficient and safe disposal/recycling of battery materials? What about the finite supply of fossil fuels?

Our readers aren't tree huggers, they're automotive and transportation engineers, analysts, consultants, and CEOs, so our focus is on what your study can tell them about their plans for future alternative fuel and hybrid vehicles. Any additional comment beyond the list I've requested would be most appreciated.

Many thanks--

Layne
Layne Holley
Editor
Hybrid & Electric Vehicle Progress
AltFuels Advisor
28 West 25th Street 8th Floor
New York, NY 10010

Answer: Layne. Please see the full report. Your response and any further questions would be greatly appreciated.

Question: Thank you, Art.

I'm impressed not only by the release I'd already seen, but by your capacity to spend so much time on the project. I'm currently producing a white paper jointly with another, larger consultancy on the environmental impact of 4x4s - and like your project, not doing it on behalf of either the auto industry or any environmental lobby, but offering advice to both.

I know a few people who will be interested to see this spreadsheet, including for instance an academic friend at the Cardiff Business School Centre for Automotive Industry Studies, who edits the Automotive Environment Analyst e-newsletter for awknowledge.com. But let me know whether I can forward it before I do so.

I have to say my engineer friends in the business have always been highly critical of hybrid powertrains, and I note that a PR war has now started between PSA Peugeot Citroen (pro diesel) and Toyota in the UK, with the latter reduced to saying, more or less, that it's offering customers a choice of two equally fine solutions, hybrid and diesel.

I have never before seen a per-unit calculation of car manufacturing energy consumption, only vague 30-40% estimates. It has a big bearing on the increasing tendency of cars' technological sophistication to reduce average vehicle life through repairs becoming uneconomic. So I'll be really glad to read your full report, and spread the message further.

Best wishes
Toby Procter
Director
Trend Tracker Limited
The CIL Building, Corsley
Warminster, Wiltshire

Question: The titular press release is very interesting for those who choose their vehicles for economic reasons. However, most everyone already realizes that the fuel savings from hybrids does not offset their added cost.

The real reason that people buy hybrids is to reduce emissions, which they normally measure as fuel consumption at the pump.

The study by CNW Marketing Research Inc. went beyond that into all the other consumptions in vehicles' lifecycles but only reported the economic analysis. Surely their data could also report the comparisons in terms of emissions, such as lbs CO2/mile, etc. While the ranking would be different I think it would be equally revealing and, in conjunction with the economic analysis, would have a much larger impact.

Further, I would be very interested in seeing a compilation of the various sources of energy consumption that were considered and how CNW Marketing Research Inc. determined the energy consumed. Documentation of the study methods would strengthen the credibility of the study.

I also wonder who financed the study and why that was not disclosed.

Best regards,
Paul

Question: Mr. Spinella,

I am writing to you about CNW's recent "Dust to Dust" Energy report. I have been working on a project evaluating hybrid cars and their energy efficiencies. I found your research study through actually a few articles posted online yesterday and today. I will be presenting the project next week, and I believe this information will be a great benefit for this. If there is any more data or research information you can give me regarding this, I would greatly appreciate it.

Thanks,
Craig Biehl

Question: Who funds your research?

Answer: All research is self-funded. We have subscribers who look for different types of results for various industries ranging from automotive to home improvements. Like a magazine, we use research as our "editorial content" and hope that the quality and comprehensiveness of that content is sufficient to generate subscribers.

In all we have thousands of subscribers in scores of industries ranging from publishing companies to Wall Street Brokerage Houses; from automakers and dealers to government agencies.

We are independent and as such have frequently offended some of our largest subscribers including virtually all of the automakers at one time or another. They do not, however, cancel subscriptions because unlike internal research that attempts to "prove" rather than analyze a point, we are trusted for (if nothing else) our independence.

Question: Dave Leggett's Just-auto.com blog...

Someone has forwarded me a note originally issued by, I assume, some kind of management consultant bloke in the US. I just felt the canoe race analogy was too good not to share. I laughed out loud at my desk. The 'humour' - if that's the right word - is pretty dark:

"This analogy is not meant to be unpatriotic, nor diminishing of corporate USA, just merely reflecting observations made in over 2,000 meetings and corporate road shows during my 19 year professional career in the US.

Even though good for a laugh, the content is leaving a lot more to reflect on, and giving explanations for why America's trade deficit will continue to grow, why that American Corporate Competitiveness will continue to deteriorate, for a long time more to come.

For those who forgot, I did predict in 2000, after hosting the 7th or so private meeting with US institutional Investors and Mr. Dick Wagoner, Chairman and CEO of GM, that GM was going to go bankrupt in the coming years, and that they had no clue how to compete, and no desire to change the corporate culture (lack there of) in order to be able to engineer and manufacture cars that the consumer wanted.

A Japanese company (Toyota) and an American company (General Motors) decided to have a canoe race on the Missouri River. Both teams practiced long and hard to reach their peak performance before the race.

On the big day, the Japanese team won by a mile.

The Americans, very discouraged and depressed, decided to investigate the reason for the crushing defeat.

A management team made up of senior management was formed to investigate and recommend appropriate action. Their conclusion was the Japanese team had 8 people rowing and 1 person steering, while the American team had 8 people steering and 1 person rowing. So American management hired a consulting company and paid them a large amount of money for a second opinion.

They advised that too many people were steering the boat, while not enough people were rowing. To prevent another loss to the Japanese, the Americans' rowing team's management structure was totally reorganized to 4 steering supervisors, 3 area steering superintendents and 1 assistant superintendent steering manager.

They also implemented a new performance system that would give the 1 person rowing the boat greater incentive to work harder. It was called the "Rowing Team Quality First Program," with meetings, dinners and free pens for the rower. There was discussion of getting new paddles, canoes and other equipment, extra vacation days for practices and bonuses.

The next year the Japanese won by two miles.

Humiliated, the American management laid off the rower for poor performance, halted development of a new canoe, sold the paddles, and canceled all capital investments for new equipment. The money saved was distributed to the Senior Executives as bonuses and the next year's racing team was outsourced to India!!!!

Carlo R. Besenius"

Question: Who funded your energy research?

Answer: Thank you for your question.

The energy study was funded by CNW. That is, we self-funded the project. So a glib (but accurate) answer would be that our employees funded the research by foregoing larger pay raises.

That is the case with all of our research.

We have no research associations with any company, group or organization.

We design, develop and instigate the research often as intellectual curiosity then offer it to subscribers which include government agencies, corporations, financial institutions, brokerage houses, environmental groups and others.

Anyone wanting data and is a subscriber cannot receive raw data bases. We control how data is released and maintain final approval on how information is presented because too often selective data points are used to "prove a point" rather than being complete, objective or neutral. We have, in the past, rejected subscribers' requests for data if and when we discover it was misused or twisted to show a "fact" that in reality is not factual or incomplete. This remains a company policy.

Current subscribers reside in various countries (eight at last count) who rely on our data precisely because it is independent.

We offer no "awards" for excellence nor accept remuneration for use of the data in marketing, promotion or advertising. Unfortunately, this is a common practice for one of the largest names in consumer research.

Our company policy is that we cannot (and do not) invest through the stock market or other means in any companies or industries that we do research on or about.

I hope that answers your question. If not, please feel free to email us for any further clarifications. To date we have received hundreds of such queries and have answered all of them as completely as humanly possible. We also are including in our upcoming report those questions and answers. This will be publicly available to subscribers and non-subscribers alike.

Question: Some of us in the "GreenHybrid.com" discussion group have been chatting about your report. We had noticed the report "cost per mile" doesn't seem to come close to either our individual or the Dept. of Energy 'Freedom Car' reports on cost per mile. As I read more about your service, I got the impression the intended target was not individuals but other clients. So I thought I'd send a note and ask a few questions. By all means, feel free to go to " www.green.hybrid.com" and answer directly in the "Hybrid Topicis > General Forum" thread titled "hybrid total energy usage greater than SUVs??".

We noticed you used units of "dollars/mile" rather than BTUs. Unfortunately, the ordinary methods of calculating the per mile cost of a hybrid also uses "dollars/mile." Needless to say, this is confusing to us. Is there some way to seperate the expense a buyer sees from expenses that preceed the purchase and follow the sale?

For example, I bought my 03 Prius used for $17,300. Based upon the NADA Blue book value change and fuel expenses, it is running about $0.15/mile. I have not included insurance but did include maintenance (so far, just oil changes.) But this is at least an order of magnitude different from your numbers. If the expenses outside of the boundry an ordinary owner driver where identifieid, it would make the report more understandable.

The spreadsheet example for the Honda Civic lists just relative percentages instead of "dollar" amounts. Granted, we could pickup your "dollar/mile" and do the math but why change to percentages in the example rather than show the "dollar/mile" values?

I drive a Prius NHW11, the closest vehicle is a Toyota Echo but I've noticed Consumer Reports used the Corolla. Which car did or would you compare the Prius to? BTW, we have a 2001 Echo and a 2003 Prius and the engine, cabin and vehicle characteristics are very close.

If I understand your business model, the full report is available for a fee. It isn't clear what that would be but I get the impression it is in the $1,000 range. What value would an individual gain by paying $1,000 for your report? Is it really designed for an individual car buyer?

Recently Consumer Reports April 2006 published a report "Hybrid Hype?" and cited ". . . according to our analysis of data from Vincentric, a company that complies ownership costs for some 1,800 vehicle configurations per model year." (pp. 21). Yet Vincentric had recommended hybrids in January as the most cost effective vehicle for fleet owners. Are your analysis complementary to Vincentric or so far apart that no comparison of the results are possible? Was Vincentric wrong to recommend hybrids?

BTW, _Consumer Reports_ issued a retraction after noting some minor math errors had resulted in errors for the Prius and Honda Civic hybrids. It happens and no one thinks the worse.

Like I said, we've been discussing the report in "GreenHybrid.com." Some folks are dismissing it out of hand and others, like me, remain curious. Feel free to scan the discussion and post there or anyway you wish. One of the things I like about "GreenHybrid.com" is the mileage database folks maintain (See the "Compare" tab.) After six months, I'm getting 49.4 MPG and we're headed into warm weather when mileage typically improves.

Thanks,
Bob Wilson

Answer: Bob: From the beginning our goal was to look at the energy impact of vehicles to society in general over the entire life of that vehicle from design, development to disposal.

Let's address just one of the questions you have. The issue of fleet sales of hybrids is intriguing. As Ford has shown, there is a significant interest in Escape hybrid among cab companies and some police departments. But that fleet use seems best if the vehicles are going to be in an urban environment with speeds of 35 mph or less. (This is for fuel-saving hybrids rather than performance hybrids like the Lexus RX400h.)

If the environment is correct and the fleet cost of the vehicle is significant and the miles to be driven (as with cabs) is high enough, a hybrid Escape is a logical choice. Will it save money for the fleet? Perhaps. It certainly will save on fuel expenses.

Unfortunately, our research shows that city-environment vehicles tend to have significant numbers of fender bender type accidents (nearly 9 times more over the lifetime of the vehicle than one used by suburban drivers). This favors the Escape hybrid over a Prius, for example, because component parts are easier to repair and less expensive from a purely business standpoint and more energy efficient on a societal scale.

The full report is free to the public at our www.cnwmr.com web site.

Question: I've been an automotive mechanic and hobbyist most of my life (which I'm now nearing the end of). I was attracted by your study quoted in the press because of an issue of regulation here in Ontario which concerns me. Older cars (20 years and more) may begin to receive heavy handed regulations with regard to emission testing. I currently have threeof these (Volvos) and would like to challenge our provincial government with some data. Years ago I heard that the energy consumed in the manufacture of an automobile represents about 25% of the total energy consumption of that vehicle over its lifetime. What I have never known, and couldn't find in your press releases, is a figure that represents a "lifetime". It seems to me that a 20 year-old car will be a net "cleaner" car than a new one, because of the lack of repeat manufacturing pollution not created. It is not economical for me to become a subscriber to your service for this one bit of data, so I'm asking for the favour of just one little freebee here. Please?
Michael Monahan
Ontario, Canada

Answer: Free it is.

Question: I have been wondering about the total cost (cradle to grave) of a hybrid compared against a traditional vehicle. This comparison would also need to include work/input-energy-unit, a measure of the rate of work output per energy input.

Obviously a morphed is more fuel efficient than a semi but the amount of work-service per mile may be less efficient. That is, if it takes one gallon of gas to move its own weight plus a rider (approx. 320 lbs) 50 miles it performs work at a rate of 16,000 lb-miles/gallon (need to covert to SI units). I don't have estimates for a semi or a mini van but this is easily documented.

I don't plan to purchase your study but it would be good to keep developing this concept so we the public don't start thinking that we are getting something for nothing. Hybrids may be a reasonable choice for many applications but they aren't a silver bullet.
Regards,
Greg B.

Answer: Agreed.

Question: Art – thanks for the response! What concerns me are actually 3 things interrelated to energy consumption:

1. increase human population
2. India and China copying 1st world technologies
3. new technologies becoming more energy intensive

These three components point to more energy consumption per capita, I suspect. So when you add these three components together and shake well, a recipe for disaster is quite possible.

I look forward to your upcoming report.

Helmut Soehn, P.E.

Sr. Engineer

helmut.soehn@ensercaeng.com

Enserca Engineering, LLC

(CNW Note: The following report was attached.)

FORESIGHT NANOTECHNOLOGY CHALLENGES

Foresight has articulated six critical challenges that humanity faces which can be addressed by nanotechnology. In the Weekly News Digest we identify news items, research breakthroughs, and events citing current research and applications providing the stepping stones to solutions to these challenges:

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1. Meeting global energy needs with clean solutions

Foresight note: This article discusses an ultracapacitor that would enable batteries to possibly outlive the item they are powering.

Headline: The Ultra Battery: A new type of ultracapacitor could eventually have you throwing out your conventional batteries.
News source: MIT Technology Review by Kevin Bullis

A breakthrough technology is holding forth the promise of charging electronic gadgets in minutes, never having to replace a battery again, and dropping the cost of hybrid cars. Indeed, the technology has the potential to provide an energy storage device ten times more powerful than even the latest batteries in hybrid cars -- while outliving the vehicle itself.

The new technology, developed at MIT's Laboratory for Electromagnetic and Electronic Systems, should improve ultracapacitors by swapping in carbon nanotubes, thereby greatly increasing the surface area of electrodes and the ability to store energy.

Ultracapacitors, a souped-up version of the capacitors widely used in electronics, have been around for decades. They're well-known for being powerful, that is, able to quickly absorb and release electricity. But they can't store much energy so their stored electricity is depleted in a matter of seconds. As a result, they've been limited to niche applications, such as providing quick bursts of power in some hybrid transit buses.
http://technologyreview.com/NanoTech-Devices/wtr_16326,303,p1.html?=DIG

MIT press release
http://web.mit.edu/newsoffice/2006/batteries-0208.html

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2. Providing abundant clean water globally

Foresight note: This panel of experts discusses the need for nanotechnology solutions for clean water. Presentations and audio online

Headline: Nanotechnology and Clean Water Panel Online
News source: Foresight 2005 Conference: Advancing Beneficial Nanotechnology

William Lee, President and CEO, eMembrane
Kevin McGovern, Chairman, McGovern & Associates (for KX Industries)
Fred Tepper, President, Argonide
http://foresight.org/publications/presentations.html

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3. Increasing the health and longevity of human life

Foresight note: An interdisciplinary group of scientists discusses how nanotech will impact health care in three specific areas.

Headline: Nanotechnology to improve health care delivery - at the molecular scale
News source: Nanotechwire.com

Nanotechnology's potential for improving drug delivery, tissue regeneration and laboratory miniaturization is being explored by a diverse array of University of Michigan (U-M) researchers.

A handful of these leading scientists from engineering, public health, dentistry and medicine discussed the promise of nanotechnology for oral health diagnosis and treatment on a special panel at the AAAS Annual Meeting on Feb. 17, 2006.

Drug delivery - To help get the most potent anti-cancer drugs off the shelf and into the clinic, U-M researchers are looking at two nanotechnology approaches to precisely deliver drugs and visualize individual cells. One system is a star-shaped synthetic molecule called a dendrimer, and the other is a tiny plastic bead called a PEBBLE.

Tissue regeneration - Panel co-organizer David Kohn, professor of biologic and materials science in the U-M Dental School and biomedical engineering in the College of Engineering, studies bone structure at the molecular level. In experiments that use tissue engineering to build bone and other mineralized tissue, Kohn said, "we use a process that's like nature's, but certainly not as elegant."

Laboratory miniaturization: Reconfigurable cell adhesion substrates - A team led by Shuichi Takayama, assistant professor of biomedical engineering, has replicated the nano-scale features and stickiness of cell-adhesion molecules in a laboratory device. Studying how the surface of a cell interacts with adhesion proteins is key to understanding signal transduction, growth, differentiation, motility and cell death. But in vitro models are hard to come by.
http://nanotechwire.com/news.asp?nid=2944

University of Michigan press release:
http://lifesciences.umich.edu/research/featured/050122/index.html

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4. Maximizing the productivity of agriculture

Foresight note: This article announces the formation of a research project focusing on portable and early detection of food pathogens.

Headline: Portable nano and micro sensors developed for food safety
News source: Food Production Daily by By Ahmed ElAmin

An EU-funded research project has developed micro and nanotechnology portable devices to detect toxins, pathogens and chemicals in foodstuffs on the spot.

The development means food samples would no longer have to be sent to a laboratory for tests - a comparatively lengthy and costly procedure - but could be analyzed for safety and quality at the farm, slaughter house, during transport, or in a processing or packaging plant, the project's researchers say.
http://www.foodproductiondaily.com/news/ng.asp?n=65976-nanotechnology-food-safety-sensor

Good Food Project
http://www.goodfood-project.org/

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5. Making powerful information technology available everywhere

Foresight note: According to this article, this research may lay the foundation for a possible optical quantum computer.

Headline: Study shows that quantum dots can "Talk"
News source: Photonics.com

Ohio University scientists who hope to use quantum dots as the building blocks for the next generation of computers have found a way to make these artificial atoms communicate.

"Essentially, the dots talk to each other," said Ameenah Al-Ahmadi, an OU doctoral student who recently published the findings with physics professor Sergio Ulloa.

The dots are tiny, engineered spherical crystals about 5 nm in diameter. An average biological cell, in comparison, has a diameter of about 1000 nm. Researchers believe that quantum dots will be extremely useful in developing nanoscale technologies because they are versatile and uniform, which could eliminate possible variations and flaws in materials.

In the recent study, the researchers were the first to use theoretical models to show how light energy shining on quantum dots would prompt them to transfer energy in a coherent, or more uniform, fashion. They found that when the dots were arranged a certain distance from each other -- greater than the radius of the dots -- light waves traveled between the nanocrystals in a consistent pattern. In previous research, the light's wavelength would change or become irregular during the energy exchange, which creates a breakdown in communication between quantum dots.

The idea is to make the (computing) process faster and smaller," said Al-Ahmadi.
http://www.photonics.com/readart.asp?url=readarticle&artid=338

Ohio University
http://news.research.ohiou.edu/news/index.php?item=264

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6. Enabling the development of space

Foresight note: Results from research done on Earth will be used to get us into space, while the results from research done in space will bring new applications to Earth. This article discusses how one astronaut will be conducting research as he orbits
the Earth.

Headline: Brazil astronaut to do nano research
News source: TMCnet

Brazil's first astronaut, who is due to fly to the International Space Station at the end of March, will conduct nanotechnology research while in orbit.

Lt. Col. Marcos Pontes, said at his first news conference ahead of the March 30 blastoff, said he was expected to conduct nine nanotechnology-related experiments and also would use the space station's photo and video cameras to monitor his country's territory.

Pontes, 42, will fly to the ISS under an agreement signed by the leaders of Russia's and Brazil's space agencies in October 2005. The Brazilian is undergoing training at a cosmonaut training center outside Moscow, the RIA Novosti news agency reported.

Pavel Vinogradov, Russian commander of the 13th expedition to the ISS, said he and U.S. astronaut Jeffrey N. Williams had a long list of assignments to perform during their six months in space, including numerous scientific experiments and two space walks apiece.
http://www.tmcnet.com/usubmit/-brazil-astronaut-do-nano-research-/2006/02/09/1355208.htm

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PRODUCTIVE NANOSYSTEMS - NEWS & EVENTS

In this section of the Weekly News Digest we will cover news, presentations or research that lead to Productive Nanosystems.

Productive Nanosystems will be molecular-scale systems that make other useful materials and devices that are nanostructured. Foresight and Battelle have launched the development of the International Technology Roadmap for Productive Nanosystems, with seed funding provided by the Waitt Family Foundation. If you are interested in becoming a Roadmap Sponsor, please contact foresight@foresight.org.

Presentation: NanoMechanical Engineering - Design and Analysis Tools for Productive Nanosystems

Mark Sims, President of Nanorex will give a presentation at the Nanomanufacturing Conference & Exhibits sponsored by the Society of Manufacturing Engineers (SME).
March 29, 2006
Los Angeles, California

Highly-specialized CAD software for the design and analysis of molecular machines is critical for the development of productive nanosystems. nanoENGINEER-1, a GPL open source project sponsored by Nanorex, is one of the first molecular CAD programs developed exclusively for nanomechanical engineering. Drawing from elements of the Drexler/Burch nanofactory animation, the presentation will demonstrate some of the key features required to aid future nanoengineers in their quest to design working nanosystems.
http://www.sme.org/cgi-bin/get-evdoc.pl?&&001624&000007&019965&&SME &

See also the presentation by Foresight founder K. Eric Drexler at this conference.
http://www.sme.org/cgi-bin/get-evdoc.pl?&&001624&000007&019965&&SME &

Downloadable brochure from SME:
http://www.sme.org/downloads/seminars/001624/brochure.pdf?id=06CF47

Nanorex is a Foresight Nanotech Institute corporate member.
http://www.nanorex.com

To find out more about corporate membership, follow this
http://foresight.org/members/index.html

April 25-26, 2006 - Carbon Nanotubes
Sponsored by Interch-Pira
Belgium, Brussels

Carbon nanotubes are poised to take the world by storm! This tiny technology

has the potential to revolutionize strength and light weighing across a multitude of different materials, making it suitable for applications as widespread as aeronautics and packaging. Attend this groundbreaking event to find out where this burgeoning technology is heading and what opportunities it could offer your business.
http://www.piranet.com

Downloadable brochure for this event:
http://www.piranet.com/pira/piranet.asp?page=confitem.htm&ConferenceId=522

May 7-11, 2006 - Nanotech 2006
Sponsored by NSTI (Nano Science and Technology Institute)
Boston, Massachusetts

Are you ready for the US's largest nanotechnology conference? It's coming up, May 7-11, 2006, at the Hynes Convention Center in Boston. It's the Nano Science and Technology (NSTI) Nanotech 2006 conference, featuring more than eight hundred technology presentations, government program reviews, early stage company showcase and expanded vertical industry symposia. Attendance is expected to exceed 3,000 with 200+ exhibitors.
http://www.nsti.org/Nanotech2006/

NANOTECH EVENTS & NEWS:

Headline: Coordinated And Integrated Oversight Of Nanotechnology Urged By Report From University of Michigan Humphrey Institute
News source: Medical News Today

New technology can enhance our quality of life, but how can we ensure the health and environmental safety of its applications? The Center for Science, Technology and Public Policy (CSTPP) at the University of Minnesota Humphrey Institute of Public Affairs has released a new report that addresses this question as it relates to nanotechnology, a rapidly emerging area with hundreds of applications, many already in the marketplace. The report captures recommendations and information developed at a conference held at the Humphrey Institute last fall.

Practitioners, academics and scientists contributed to the report, "The Nanotechnology-Biology Interface: Exploring Models for Oversight," and their conclusions raise issues for government bodies, scientists, the private

sector and consumers. According to the report, the applications of nanotechnology require revised risk models and standards of safety. Researchers and others argue that it is increasingly urgent we address the issue of oversight as several new products already are in use by consumers and many more are on the way
http://www.medicalnewstoday.com/medicalnews.php?newsid=37903

See the full report, including Foresight VP Christine Peterson's contribution:
http://www.hhh.umn.edu/centers/stpp/nanotechnology.html

EDITOR'S PICK

Dear readers -- When reviewing news for this digest, I often read about something that I think is cool, but it doesn't fit within the usual editorial categories of the News Digest. This section highlights a nanotech advance, event or idea that I think is especially cool.

One of the great promises of nanotechnology is clean manufacturing and stronger materials. This article discusses an MIT breakthrough that could replace highly toxic metal coatings such as chromium, by shrinking the size of crystals.

Headline: Researchers think small to find safer alloys
News source: Monsters & Critics

Massachusetts Institute of Technology scientists say they have devised a method for shrinking the size of crystals to make safer metal alloys.

The Cambridge, Mass., researchers say the new materials could replace metal coatings such as chromium, which is dangerous for factory workers to produce.

The method, developed by Associate Professor Christopher Schuh and graduate student Andrew Detor, involves making the crystals within an alloy smaller and, thus, harder.
http://science.monstersandcritics.com/news/article_1131826.php/MIT_scientists_seek_safer_metals

MIT press release:
http://web.mit.edu/newsoffice/2006/chromium-0215.html

Question: From: "David A Bainbridge" <bainbrid@alliant.edu>

Nice to see you raise some dust with your latest report on lifecycle costs. I have been very reluctant to recommend hybrids for just this reason… a Toyota Echo or Honda Fit is a much better proposition. A small biodiesel might be even better.

Key issues not mentioned in your release were lifetime (I expect 250,000 miles from a car) nature of recycling calculations. Some are quite easy to recycle – some quite hard. The latter would be hard to develop but are quite substantial.

David A. Bainbridge
Associate Professor, Sustainable Management
Marshall Goldsmith School of Management
Business & Management Division
Alliant International University

Answer: To your point, there is no doubt that a Toyota Echo, Honda Fit or other "B" vehicle -- especially with a diesel engine -- would be far more energy efficient from dust-to-dust than the current crop of hybrids.

As for life-mileage, our estimates range from 110,000 to roughly 290,000 miles. Add to that the required maintenance and replacement of some components and the equation becomes more in favor of simpler vehicles.

Some of the content, such as aluminum, light-weight steel and/or "quiet steel" are far more difficult and energy intense to manufacture and recycle than conventional steel. The ability to recycle difficult components -- nickle-based batteries, complex electronics and controllers and motors -- similarly pose an energy problem.

Overall, B-class vehicles are a far better choice in virtually any lifecycle analysis.

Question: Hello, I'm an American consumer, and a student, and I am curious as to what companies sponsor the research done by CN(W). If you could respond with some names of companies who contribute the largest amounts to CN(W)'s research, I would greatly appreciate it. If that is not possible, if I may be directed to someone who can help answer my questions that would be very helpful.
Thank you very much and have a lovely day.

-Candice Vu-

Answer: Hi Candice...

Thank you for your questions. With your permission, they will be part of our upcoming Energy

Report because they deserve to be both answered and expanded upon.

I should begin this with one piece of information. I was the publisher of an electric vehicle newsletter in the 1970s and actually drove an EV to and from work on Los Angeles freeway. The distance was 26 miles each way at speeds up to 60 mph. My EV was a conversion of an R10 Renault that would easily top 60 mph. Maximum range was about 60 miles in mixed city/freeway driving. I love alternative fuel vehicles and have been a proponent of them for more than 40 years.

I fully understand that early development of new technology is expensive. But here is a simple fact that every scientist and energy expert and automotive engineer agree on: The more complex a vehicle is, the more energy it takes to manufacture and dispose of. Even Toyota's executives have told the Japanese, European, Australian and U.S. press that this is the case. The complexity can be reduced, so the energy requirements can be reduced. But never to the point of a comparable simple vehicle. That's the reason the Scion xB was the most efficient model offered last year.

As for the energy study... It was funded by CNW. That is, we self-funded the project. So a glib (but accurate) answer would be that our employees funded the research by foregoing larger pay raises.

That is the case with all of our research.

We have no research associations with any company, group or organization.

We design, develop and instigate the research often as intellectual curiosity then offer it to subscribers which include government agencies, corporations, financial institutions, brokerage houses, environmental groups and others.

Anyone wanting data (even subscribers) cannot receive raw data bases. We control how data is released and maintain final approval on how information is presented because too often selective data points are used to "prove a point" rather than being complete, objective or neutral. We have, in the past, rejected subscribers' requests for data if and when we discover it was misused or twisted to show a "fact" that in reality is not factual or incomplete. This remains a company policy.

Current subscribers reside in various countries (eight at last count) who rely on our data precisely because it is independent.

We offer no "awards" for excellence nor accept remuneration for use of the data in marketing, promotion or advertising. Unfortunately, this is a common practice for one of the largest names in consumer research.

Our company policy is that we cannot (and do not) invest through the stock market or other means in any companies or industries that we do research on or about.

I hope that answers your question. If not, please feel free to email me directly for any further clarifications. To date we have received hundreds of such queries and have answered all of them as completely as humanly possible. We also are including in our upcoming report those questions and answers. This will be publicly available to subscribers and non-subscribers alike.

Warm regards,
Art Spinella
President
CNW Marketing Research, Inc.

Question: I am frightened by the statements that you have made in regards to the hybrid vehicle. These statements are some of the most irresponsible remarks I have ever heard coming from a supposedly credible person. You are obviously not a historian or you would understand that no form of energy consumption has ever started out at its most efficient form. Most forms take decades or even centuries to develop to their full potential, let alone hybrids, fuel cell vehicles and others. Pay attention! The gasoline and diesel engines have still not reached their full potential regarding efficiency. Obviously the hybrids have barely scratched the surface! Did your parents drive a hybrid? To go out to the general public and suggest that hybrids are bad, without telling the entire story is shamefully irresponsible. You are either over educated and under smart, or you are on
someone's payroll and without ethics.
Sincerely,
Andrew Weber

Answer: Andy...

Thank you for your comments.

I should begin this with one piece of information. I was the publisher of an electric vehicle newsletter in the 1970s and actually drove an EV to and from work on Los Angeles freeway. The distance was 26 miles each way at speeds up to 60 mph. My EV was a conversion of an R10 Renault that would easily top 60 mph. Maximum range was about 60 miles in mixed city/freeway driving. I love alternative fuel vehicles and have been a proponent of them for more than 40 years.

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Warm regards,
Art Spinella
President
CNW Marketing Research, Inc.

Question: After viewing the clip on CNN web site, I felt I needed to inform you, if you haven’t already heard of them, about the Scuderi Split Cycle Air Hybrid Introduced at the SAE show in Detroit this month. I think it would be of great interest to you to go and check out the Scuderi Engine design on there web site. www.scuderigroup.com. This engine solves almost all of the issues you discussed with its high gas mileage, clean burning and non complicated Air Hybrid Design. It will pretty much make most of the existing hybrid systems obsolete. A few minutes of looking at what they have here should convince you this is the future of combustion engines. Please take a look and get the word out that this is the way to go.

Thank you
Alan

Answer: Alan...

Thank you for the air hybrid link. When I was the editor of Ward's Engine Update (nee: The Wankel Report) some years ago we looked hard and long at air hybrids. These folks seem to have resolved many of those early issues and problems. I've written to them to get some additional details. I have always been convinced this is a solid alternative but had not followed the technology as closely as I should have over these past years.

With your permission, I would like to include your letter and the Scuderi link in the upcoming report in the Q and A section.

Again, thank you for writing.

Art

Question: I was wondering, how can a car that costs the consumer, say, $20,000 new and uses around $15,000 in fuel over a 100,000 mile lifetime end up having a total energy cost of, say, $250,000 ($2.50 per mile)? (Since this is way more than the consumer has paid…which is more like $35,000.) If $250,000 really was the true energy cost, wouldn't a car be much more expensive to the buyer than it is now?

-Roy

Roy W. Spencer
The University of Alabama in Huntsville
320 Sparkman Drive
Huntsville, AL 35805
voice: (256) 961-7960
fax: (256) 961-7755
cell: (256) 652-5974

Answer: Roy...

Excellent question and point.

If an automobile lived in a capsule, if there were no other energy requirements for supporting the infrastructure of automotive driving, you are correct. A consumer would be asked to pay literally 10s of thousands of dollars for a vehicle.

But cars live in an infrastructure including support services (oil changes, for example) and disposal industries.

That added cost per mile is borne by other industries and generate profits for those industries. For example, recycling (many) of the parts of a vehicle is highly energy intense. Fortunately, those costs are borne by secondary industries because they are willing to pay in excess of the cost for the resulting components or recycled material.

We'll get into this in detail in the upcoming report.

With your permission, we would like to use your email in the Q&A section of that report.

Question: Hey, I saw your guys are from Bandon - that's where my mom lives now. I vacation down there many times a year.

Anyway, I was reading this article that was based on your report:

http://biz.yahoo.com/prnews/060331/sff031.html?.v=38

And it totally fails the back of the envelope calculation estimates that we do all the time in software engineering. For example, you had a Honda Civic at $2.42 per mile in energy cost. The Civic gets, what, 25 miles a gallon? So, that's $0.12 per mile. Which leaves $2.3 per mile in energy cost - not counting fuel consumption. So, over 100K miles, you're saying that the Civic costs another $230K?! That's absurd - Honda doesn't see their cars for a loss, so you can assume that the energy cost to create the car is less than price of the car new, so let's subtract $30K. And let's say you are a little old grandma that leaves the car in absolutely perfect shape, so you have another $30K at the end.

That still leaves $170K on the table? That makes no economic sense - that money has to come from somewhere. The Hummer numbers are even more ridiculous.

Or did Yahoo quote your report incorrectly?

Jeff
RAD Game Tools

Answer: Thanks for the email and say hi for me to your mom when you talk to her. Chances are pretty good someone in our family knows her.

To your question: That's the problem with back of the envelope calcs. We do them here, too.

If an automobile lived in a capsule, if there were no other energy requirements for supporting the infrastructure of automotive driving, you are correct. A consumer would be asked to pay literally 10s of thousands of dollars for a vehicle. What if a computer buyer, for example, had to pay for your software and everyone else's software as well as the crushing of old pcs, disposal of crts, etc.

But cars live in an infrastructure including support services (oil changes, for example) and disposal industries.

That added cost per mile is borne by other industries and generate profits for those industries. For example, recycling of the parts of a vehicle is highly energy intense. Fortunately, those costs are borne by secondary industries because they are willing to pay in excess of the cost for the resulting components or recycled material.

We'll get into this in detail in the upcoming report. In the meantime, if you'd like to see the stuff already released, go to www.cnwmr.com and click on the "Energy Report" button. (See? I'm supporting the computer industry with my energy.)

With your permission, we would like to use your email in the Q&A section of that report.

Thank you again for writing and I'm going to visit the radgametools.com site as soon as I send this. (Gads, more energy!)

Best,
Art

Question: Sure, but the support requirements are nothing - we have good numbers for this because you can buy extended warranties that cover all support requirements and they are far, far less than the original cost of the car.

And we know what disposal costs are because we know what it costs to either have a car hauled away for scrap, or to resell it for recycling at the end.

These costs don't even come close to making up for the $160K worth of costs that are missing in my Civic example.

But cars live in an infrastructure including support services (oil changes, for example) and disposal industries.

Right, but let's say that for some crazy reason this adds up to $160K per car (which is crazy) - even then, cars like a Hummer require tons more support and disposal costs than a Civic. The numbers don't make sense.

For example, recycling of the parts of a vehicle is highly energy intense.

Right, but the cost for the recycling is the same or less than the original cost of the car, otherwise we wouldn't bother recycling.

Question: Let me put it another way - the government allows you to write off $0.45 per mile for use of a car - this is for energy costs, *and* depreciation of the car and insurance! So, in the Civic example, that means you have a $2.60-$0.45 delta to make up - what is this? Cost of pollution, cost of roads? If so, then this delta should be *larger* for larger vehicles. Again, there is no way to make your numbers stack up.

Answer: What if a computer buyer, for example, had to pay for your software and everyone else's software as well as the crushing of old pcs, disposal of crts, etc.

You do. The CRTs are either thrown away (and you pay the disposal company to take it to the dump), or you sell it to someone who is going to recycle it. They aren't going to pay you more than the cost to recycle. You do pay for everyone's software - you pay for the bank's software when you pay your bank charge at the end of the month.

Question: Economics is a closed system. You can't hide $160K without someone losing $160K, so far, you haven't shown me who lost that money - the consumer, the manufacturer, the support people, the disposal people? All of these people are profit generating industries - they aren't in business to lose money. The government? Taxes for the average household don't come close to covering a $160K shortfall, even over many years. And trust me, I pay a freaking ton of taxes and it wouldn't come close to covering the difference for my two cars (Ferrari 360 and, hey, a Prius).

Your numbers just don't make sense - you are double or triple or quadruple counting the energy cost somewhere. It doesn't make sense otherwise.

Answer: We are NOT talking about the cost of insurance or the cost of extended warranties. We are discussing the energy needed to support a single vehicle. Economics is not a closed system. The “$160,000 shortfall” generates profits for someone along the line be it the scrap yard or the soda can industry.

With your permission, we would like to use your email in the Q&A section of that report.

Question: Sure, only if you allow me to continue to dispute your conclusions - which, I more sure of than ever, are incorrect.

And you're kind of missing the point of back of the envelope calculations. Back of the envelope means you have estimates of costs, but you have all the factors. I'm estimating all of the factors that you claim, and yet we aren't even remotely close. That's what back of the envelope is designed to red flag...

Question: Here's another example of how high your numbers are btw. Let's take a middle of the road car on your list at $2 per mile. Now let's say we get 100K miles on each before the recycle bin. Ok, there were 17 million new cars sold in America.

17m * 100K * $2 = $3.4 trillion expended per year for cars?!?! That's nuts - that would be 30% of the entire GNP of the US. Which is just ridiculous, right? It's an impossibility.

Another way of thinking about it - 300 million people, average of 1 car per person (it's slightly higher than that, but hey), same $2 per mile, 5000K miles per year. 300m * 2 * 500K = $3 trillion again?! WAY too high.

Answer: Clearly you don't have all of the factors or refuse to understand them. Let's put the auto industry into perspective. States with sales taxes rely on 20 percent of their revenue from auto sales. This does not include the taxes received from support industries (such as something as simple as an oil change) to revenue generated by financial institutions for your auto loan. Again, back of the envelope calculations often bear false notions and views.

Question: I just skimmed thru some of the comments on the GreenHybrid website and wonder if some of the confusion has to do with your using $$ symbols in your assessment. What if you took away the money reference and simply assigned an icon or something? From what I understand, the actual COST of the vehicle is irrelevant. (If the Maybach were free, it would still be the highest consumer of energy, right?) People seem to be getting very confused between cost of ownership and lifetime cost to the environment.

Answer: Likely. But they would be even more confused if I'd used gigajuelles. We needed to use something that was understandable to consumers and could grab attention to the issue of energy consumption. The ones who aren't confused are the scientists and engineers who have contacted us.

About half of the non-techies also get it. The hybrid promoters are appalled because no one likes to see their world view threatened.

Especially when the context is really one of fashion statements. (In the 50s it was tailfins; in the '60s it was muscle cars; 70s, small cars and diesels; 80s minivans; 90s SUVs; and today it's hybrids.)

Your point about the cost of the vehicle being irrelevant is true. For example, Bay Area Rapid Transit costs the rider about $2 But society -- San Francisco and environs -- makes up the difference of about $3 per rider. Same for vehicles. Society pays a price for having individualized transportation, usually in excess of tens of thousands of dollars.

The difference, however, is that there are multiple payments for the vehicle over its lifetime, profits made from the scrappage and recycling process, etc.

Best,
Art

Question:

From: "Pedro Monteiro" <pedro_monteiro@yahoo.com>
To: "Art Spinella" <Mailroom@cnwmr.com>
Subject: Energy Cost per Mile spreadsheet suggestions - Sierra Club Contact
Date: Wed, 12 Apr 2006 17:31:42 -0400

Art,

Thank you for taking the time to speak with me on the phone today about the "Energy Cost per Mile" study. Thank you also for performing the study, and making it available to the public for free. Actions like this can help make the world a better place, and perhaps slow the effect of global warming.

I have been postponing the purchase of a Prius because of concerns about lifetime energy consumption. Your study is therefore quite timely on a personal level. Maybe I'll buy a Selfish Utility Vehicle and cover it with anti-SUV global warming stickers!

FYI, I have a degree in electrical engineering, and I am on the Energy Committee of the Florida Chapter of the Sierra Club. I am publicizing your work within our committees. Hopefully it will lead to some changes.

Please add me to your mailing list for early updates on the publishing of this study. pedro_monteiro@yahoo.com.

When your team prepares the expanded Excel spreadsheet I hope that you consider the following suggestions:

Suggestions for the upcoming Energy Cost report:

- Expand the "Energy by category example.xls" spreadsheet
    - Include the **manufacturer** name
    - Add a **fuel type** field (e.g. diesel, gasoline, LPG).
    - Include the columns shown in "**Energy by category example.xls**." This will enable the reader to answer questions such as which categories contributed the most to the energy cost (e.g. manufacture, transportation, mileage).
    - Include the **MSRP** for each vehicle. This will allow readers to correlate car cost with embodied energy of the vehicle. The MSRP/energy correlation probably varies by Segment, but is likely to be highly correlated within each vehicle Segment.
    - Add an average **MPG** rating for each vehicle. While the EPA rating may not be accurate, it will at least allow for some analysis.
- In the narrative assessment of the "E Cost Per Mile," please comment in depth about how the concept and research stage was weighed into the final energy value.

- We do not want to deter the industry (directly or through market forces) from innovating. It may be good to find a way to de-correlate the R&D from the figures. Otherwise we may not progress beyond Model T technology. Incidentally, you probably know that the Model T got 25 MPG; better than the average Ford mileage today.

Maybe we can get the industry to include lifetime energy ratings on the EPA window sticker. The hard part about that would be coming up with a formula that is auditable. Maybe the EPA can factor CNW's energy numbers into the DOE EPA MPG database, as they seem to consider primarily emissions and not vehicle production and lifetime issues.

I hope you consider **updating these figures annually**. Apart from creating a positive industry force, it will also be good publicity for CNW. On that note, if you update the energy cost annually, you should put some thought into what units to use.

What was the **basic energy unit** used in this study? Was it Joules? kW*h? Can you consider publishing using different units that will not fluctuate with the price of fuel or inflation? If we know how to equate your "energy cost" to a standard unit on measure (e.g. Joules per meter), then we can derive our own units.

Although the public may not have a feel for how much one Joule is, but they can be told in everyday terminology. You could find good examples on this Wikipedia page.

Units to consider:

- **Dollar per mile:** varies with fuel cost and inflation.
- **Gallons of gasoline per mile:** this is a good one. The real energy mileage from dust to dust. FYI 4.8×10^7 J = energy released by combustion of one kilogram of gasoline.
- **Dust to Dust MPG:** the reciprocal of the measure above. Should be an interesting number.
- **Joules (J) per mile:** one Joule is the amount of energy required to lift an apple from the ground (about 1 meter). Ironically, this would convert directly to Newtons (Joule = 1 Newton * 1 meter), which is a measure of force.
- **kWh per mile:** (3,600,000 J (or 3.6 MJ) = 1 kW·h
- **Newtons:** this is actually the basic unit of energy divided by distance (force).

Have you heard of the book Cradle to Cradle: Remaking the Way We Make Things, by William McDonough, Michael Braungart?

Thank you for your work.

Pedro Monteiro
Sierra Club
Florida Chapter Executive Committee
Florida Chapter Energy Committee

Answer: Duly noted and expect to see follow up reports in the years ahead.

Question: Good job on your Dust to Dust research! Your energy usage model program, as far as I can tell, doesn't take into account diesel. I was wonder where cars like the Mercedes E320 CDI, Passat TDI or the Smart Car might fit in?

Answer: We have been sorting the data by engine type and will break out the diesel and bio-diesel data shortly. It will certainly be in the upcoming report.

As for the Smart Car, we didn't include it because it was not sold in the U.S. in cy05. While some have been imported, but it was difficult to get to the final data. We have included it in the subsequent report that will be issued later this year.

Question: The Cooper Union for the Advancement of Science and Art, established in 1859, is among the nation's oldest and most distinguished institutions of higher learning. The college, the legacy of Peter Cooper, occupies a special place in the history of American education. It is the only private, full-scholarship college in the United States dedicated exclusively to preparing students for the professions of art, architecture and engineering.

The Cooper Union for the Advancement
of Science and Art
Cooper Square
New York, NY 10003-7120

From: granat@cooper.edu

Question: Dear CNW Marketing Research group,

I read your article recently in my energetics class, and I shown light onto an issue that we've discussed. I am a senior in the Mechanical Engineering Department at The Cooper Union for the advancement of science and art. We determined that is cost more per mile to drive a hybrid then a sedan in the view of the consumer. i just want to know what equation that you used, or what factors that you implemented to come to the cost totals that you released for publication. Thank you for your time, and thank you in advance for any information that you might give me.

Regards,
Michael Granat ME '06

Question: A certain Chrysler executive once observed that the American public wanted economy, and they were willing to pay anything to get it.

My guess is that the Gallup poll did not include price premium considerations, but experience suggests most Hybrid vehicles are not being bought on economic justification in any case. If there is any attitude that universally applies to the light vehicle market, it is that the customer is looking for the best vehicle she can find at her price, rather than the lowest price she can find on a vehicle. The definition of what constitutes "best" can vary widely from segment to segment, but the search for same remains remarkably constant.

Back in my Detroit days, the automotive research fraternity constantly carped about the variance between the "intender" numbers in the old Allison-Fisher Intender Study and actual registrations...to the point of suggesting that said variance rendered the study so inaccurate as to be useless.

My own take was that the difference between intentions and deliveries was an indication of what the dealers were doing at retail to move the metal. Brands and models with higher intentions than sales also tended to show higher image scores and transaction prices. Brands with lower intentions were buying their market share. It has been a while since I got to fiddle around with such numbers, but I would be willing to wager an account guy lunch that an analysis of your intention data against the JD Power PIN numbers would still correlate closely with the costs the industry incurs to generate retail sales.

At least some of the differences we are seeing in the hybrid market are a function of where the vehicles are being sold. There is no reason, other than delivery date, for a Toyota prospect to visit a Ford dealer, and a Ford dealer's customers are likely to be so upside down in their current ride that they cannot afford to drive anything that does not come with some sort of downpayment assistance on the hood...whatever their preference. It is also more than likely that Ford salesmen are putting a full court press on everybody who walks onto the showroom floor to drive off in whatever vehicle Ford is pushing hardest...and that is not yet a hybrid.

Ford's decision to decimate their field sales and service forces hasn't helped. The single best predictor of the success of a new model launch is the quality of pre launch retail sales and service training, and Ford's recent reductions in the relentless pursuit of economies of scale...hurt. If Toytoa does have an unfair advantage in the American market, it is the quality and dedication of their field group.

Finally, the customer is not an idiot, she is your accountant. For all of his current polling problems, when President Bush announced that the country has become addicted to imported oil, more than a few drivers listened. Books like the Stephen Leeb/Glen Strathy "The Coming Economic Collapse (How You Can Thirve When Oil Costs $200 a Barrel) " are selling well...these are scary times...and the prospect of not being able to get around has always been the primary driver of "maximum efficiency" automotive sales.

Willy

Question: Remember the seventies...and all those Volvo owners clodding along at 55 mph, intentionally clogging up the left hand lane to insure that nobody else drove any faster?

Of course, with the advent of the Federally mandated double nickel came also the introduction of CB radios, radar detectors, and a continuing overall increase in interstate highway speeds...if memory serves, the last Cannonball Baker Sea-to-Shining-Sea trophy collector averaged just over 88 mph, across the entire continent.

My guess is that no one is going to take our foreign policy seriously as long as we insist on paying half of what the rest of the world spends for oil, and that when gas crests $5/gallon over here, we will begin to see some technology in an entirely new light. There were quite a few Escape Hybrids roaming the streets of New York in Taxi livery...which for once makes infinite sense.

As for this humble ad weasel, some of these new Audi oil burners seem awfully...enticing...even without the $5/gas...

Question:

California carpools put the squeeze on hybrid drivers
By Amanda Covarrubias
Los Angeles Times
http://seattletimes.nwsource.com/text/2002931391_hybrids15.html

"There's a mentality out there that we're a bunch of liberal hippies or we're trying to make some statement on the environment," said Travis Ruff, a real-estate agent who drives a Toyota Prius.

The California Department of Transportation, which has issued carpool-lane stickers for about 50,000 hybrid cars, plans to study the effect of hybrids on carpool lanes in Southern California.

"There's not enough excess capacity to absorb the hybrids," said James Moore, director of the University of Southern California's transportation-engineering program. "I think the foreseeable outcome here is that the congestion advantage we traditionally attribute to [carpool] lanes will disappear."

A debate over carpool-lane congestion also is occurring in Virginia, which like California allows solo hybrid drivers to use the lanes. Last month, the Virginia legislature placed restrictions on hybrid drivers using the lanes in peak hours.

The California Legislature approved the hybrids in carpool lanes to encourage the use of the low-emission, high-fuel-economy vehicles.

The law grants carpool-lane access to hybrids that get at least 45 mpg. So far, only the Toyota Prius, Honda Civic and Honda Insight qualify.

From the beginning, the law has prompted complaints from carpoolers. But in recent months, the criticism has grown as carpoolers accuse hybrid drivers of clogging the lanes, also known as high-occupancy-vehicle (HOV) lanes.

"Prius drivers tend to drive slower, and it makes the HOV lanes slower," said Theresa Poprac, who commutes on Interstate 405 every morning from her home near Los Angeles International Airport to her job at an educational software company in Costa Mesa.

The chatter is more biting on Internet car-chat rooms, where some carpoolers have declared themselves "hybrid haters."

"These [drivers] barely go 65 mph," fumed one driver on the Edmunds.com car town hall. "Talk about road rage!"

"Go with the flow, or get the heck outta the way!!!," wrote another in support.

April 15, 2006 - Page updated at 12:00 a.m.

Question: I've taken a look at some of the data posted on your website about total energy requirements for certain vehicles and some of it doesn't quite make sense. Do you have more detailed data on the calculations used to create your tables? Unless I am missing something, it looks like your total energy cost is overestimated or includes hidden costs not known to most people.

Looking at your numbers for the Honda Civic Hybrid, for example, you claim a total energy cost of $3.238/mile. Assuming a very conservative life of 150,000 miles, then the total lifetime energy cost would be $485,700. Your table shows that a total of 28.95% (or $140,610) of this energy is allocated to Suppliers, Main Plant, Transport, and Distribution. This means that if Honda sells this vehicle new to the consumer for $25,000, then they are taking a loss of $115,610 per vehicle just on the energy alone, excluding any of their costs for labor and other non-energy costs. How can this be? Do you have any documentation that would make your calculations more clear?

Any feedback you can provide would be greatly appreciated.

Best regards,

Andy Friedl
ONDA ENERGY

Question: I was e-mailed a press release that you all were involved entitled: "Hybrids Consume More Energy in Lifetime than Chevrolet's Tahoe SUV" from Friday March 31, 2:10 pm ET. I enjoyed the look at "dust to dust" energy figures, and wanted to make you aware that the natural

gas industry faces the same challenge in current governmental energy efficiency standards and promotions. All that is currently looked at in those standards is end-use appliance efficiency. When examining cost from point of origin to consumption, natural gas is actually far more energy efficient than electricity, but this is not relayed to the consumer, only the actual appliance efficiency is.
Thanks for your efforts,
Cliff Swoape

Question: I am an auto consumer, and I saw a recent news article about your "Dust to Dust Energy Use by Model - Cornerstone document of CNW's 2005 Models Energy Report. Cost per mile to drive every model sold in the U.S. in 2005." I am interested in reading this document in its entirety to get the whole picture, but I am not a subscriber. Is there a way to read this without subscribing, or getting a low cost subscription? Thanks, Michael Sigmond

Answer: The study is available free of charge to the public as a means of making consumers more aware of the entire social cost of driving specific vehicles. This is useful not only for a new vehicle, but when buying a used version of the same vehicle.

Question: Dear Mr. Spinella,

Interesting report!

Can you tell us for which client you carried out the 2-year investigation?
At least what industry that client is in?

Regards, Bob

Answer: This was not done for any client or subscriber or organization outside of CNW. We funded the research ourselves without the knowledge of or input from any outside group, organization or company.

Thanks for writing. As you can imagine, we've received hundreds of emails and letters about the Dust to Dust report.

To your question: We funded the research ourselves. In fact, no outside organization was aware of the goal of the research until we announced the initial findings. It was a year in the planning and two years in execution with updated data completed on cy2005 sales in January.

An expanded report will be issued to subscribers in about a week with public access (no charge) by mid-May or so.

Like all of our research, we perform it and make it available to subscribers. So technically, they fund the work. The nub of this idea began in the middle 1970s when I was publishing an electric vehicle newsletter in Los Angeles and drove an battery-powered Renault to and from work on LA freeways. (26 miles in each direction; top speed around 70 mph. Unfortunately, not simultaneously.) Photos attached. Note that there's a Chevette in the garage, as well. Egads, what was I thinking.

At that time, many engineers I interviewed talked about the energy costs of manufacturing conventional ICE powered vehicles vs. battery powered. In virtually all cases, the energy argument was fully against battery power. Needless to say, that notion stuck and lo these many years later, I thought it was time to visit the issue again, only on as large a scale as possible.

In all there were nearly 4,000 data points per vehicle that needed to be addressed in a useful "dust to dust" energy-use comparison. For obvious reasons, we needed to reduce this information into bite-size pieces and put the comparisons into something average consumers could relate to. (Gigajuelles certainly wasn't the answer.) We selected "dollars per mile." More on that in the report.

I've put you on the list to be notified when the expanded report is published.

Question: Why did you use dollars as a measurement of energy? Isn't energy measured in different forms (therms, calories, etc)? I find your study interesting as I just placed a reservation for a Prius. Can I get a more detailed copy so I can make a more informed decision? Aaron Liebert

Answer: We spent a year in designing the research and two years conducting it with updated data for 2005-2006 vehicles completed in February.

During that process, we explored many different ways of releasing the information from gigajuelles to kW hours. Because our subscribers are not technically oriented in energy consumption terms, we elected to translate the data into energy cost per mile feeling it would have more relevance to everyday people. While that added significant problems for us -- translating energy rates per kW hour to local currencies (eight countries and multiple municipalities) and then to U.S. dollars -- we felt it would be easier to understand to the broadest number of consumers. This is similar to the decision decades ago to use "miles per gallon" as the common denominator in explaining fuel economy rather than using energy units that distinguish between regular and premium gas, for example.

As the one-time publisher of an electric vehicle periodical in the 1970s, technological terminology was always a barrier to understanding the true nature and use for electrics, so I guess the germ of making it more easily understood has been in the back of my mind for 30 years.

I will make sure you receive the full report when it is made public in mid-May.

Hope that helps and I'm sure you will find the Prius to be an extremely good vehicle providing years of excellent service.

Best regards,
Art Spinella
.

Question: Art,

Thank you for the reply. I've shared your study results with a number of people and quite a few have questioned the results you tabulate. For example here is one typical comment:

"If a typical hybrid uses $3.50 of energy a mile then over the life of the car (150K) it would use $525,000 in energy. Who's paying for all this? These numbers are either too high or we are to believe that most of the energy cost is not be passed on to the customer and the manufacturer or parts supplier is eating the energy cost to make his product."

Your comments would be appreciated.

Mike

Question: At 01:03 AM 5/4/2006, you wrote:
I found the list of vehicles' "E cost per mile" in Document1095.xls very informative.

I assume that the Landcruiser example you used is a gasoline engine model.

I drive a diesel Landcruiser that gets 24 MPG and these vehicles typically last 500,000 miles or more. What would be the "E cost per mile" for the diesel Landcruiser, with it's better fuel economy and longer life, assuming the other factors were the same as the gasoline Landcruiser.

Mike Peltier

Answer: Mike...

You are correct, the diesel Land Cruiser is significantly less costly per mile than the gasoline version. We'll include the diesel versions of various models in an upcoming report.

In the meantime, we've put you on the list to receive updates to the Dust to Dust study. The full report is due out this month.

Yes, the Landcruiser data is for the gasoline version.

Question: Very well done indeed - at last a study that proves that hybrids and less environmentally friendly than standard vehicles and even less friendly than

SUVs.

I hope your findings get a lot of publicity.

The downside to this is that customers might not feel so bad about SUVs and
continue to buy them. What we actually want is people to buy small vehicles
and consume less gasoline and less energy during a vehicles manufacture.

According to the Automotive News article I saw, you are prepared to provide
a copy of your results spreadsheet. If this is the case I should be grateful
if your would send me a copy.

Thanks very much

Regards

John Buckland
Automotive Analyst
Daiwa Institute of Research Europe Ltd /
Daiwa Securities SMBC

Answer: John...

Thank you for writing. I concur. Driving more fuel efficient vehicles is clearly the goal and as the market is proving large SUVs have less of a following than they had in the past. (Editor's Note: This is happening on the used-vehicle side as well.)

The true nature of the issue should be to drive a vehicle that suits the needs of an individual and family. In some cases that may mean having a large pickup and/or a small economy car. That balance within the family or for an individual can be maximized with the selection of specific transportation addressing both environmental and personal needs.

An interesting side note is that families with multiple vehicles are changing their use patterns of those vehicles. As part of the report we looked at family-fleet real-world fuel consumption. What we found: the family with a Prius and multiple other vehicles has a family fleet fuel economy of about 29.5 mpg. The family with a Hemi Ram Pickup has a family fleet fuel economy of 27.9 mpg. (These are real-world use economies, not just an average of the vehicles in that family.) We'll elaborate more in the final report.

A comparison of the same pair of families shows the overall energy used in a Dust to Dust analysis is statistically identical.

As the study and text go through the editing and legal processes, the release date is now about a week away. I will certainly make sure you are notified when Dust to Dust is posted.

Again, thank you for writing.

Best regards,

Art Spinella
President
CNW Marketing Research, Inc.

Question: I don't accept the conclusions of your study which concluded with the fact that Hummer's were cheaper over lifetime use interms of energy than a hybrid vehicle. I'd like to know what asssumptions you made about the cost fo manufacture the metal that goes into a Hummer. Also, how much of the total lifetime energy use is assigned to driving, versus manufacture. Also, who funded this research? Thanks, Jenifer Taylor
Jennifer

Answer: Thanks for you question. They are good ones and worth exploring in detail in the final report which we will do.

To answer you: The study shows that H2 Hummers have approximately $800 worth of medium-weight steel used for manufacturing. Of this, less than $200 dollars is spent on energy to produce that steel. Medium-grade steel is extremely easy to recycle because the infrastructure to do so has been in place for literally decades.

To compare it to the Prius, for example, the cost of light-weight steel and steel composites used in that particular hybrid has a cost of about $585 (excluding the battery pack and related components). Unfortunately the energy necessary to produce this high-tech metal is about $230. The current and intermediate future of recycling light-weight steel and composite steel is less advanced. That means, simply, that the energy cost to dispose of this metal actually costs slightly more even though there is less of it.

We expect the light-weight and composite steel disposal cost will decline over time as the infrastructure improves, but we cannot and did not make that assumption because we don't know, at this point, when or even if that technology will be developed.

In addition, there is a question of how that recycled material will be re-used and for what types of second-generation products. Aluminum is passenger cars and trucks, once horribly expensive to dispose of, has finally found a way back into this second-generation market as cans and other packaging, but high-tech steel is simply not cost effective for such uses -- yet.

Over time, it is likely that recycling of high-tech steel will match the disposal cost of medium-steel. That, in turn, would bring the cost down to a point where it can be blended with medium-strength steel and find its way back to market as second-generation and even third-generation products.

But the simple fact is this: High tech solutions to such issues as rust -- few vehicles rust any longer -- costs more to produce in both financial and energy consumption terms. Complexity equals higher energy requirements.

Over the past 50 years, one of the most energy efficient vehicles -- from Dust to Dust -- was the original Volkswagen Beetle. Extremely simple to build; low-cost metals; lack of complex components; easily disposed of; high fuel economy; low maintenance; the most rudimentary of engines (from an energy consumption to build standpoint); and easy on the social transportation infrastructure (such as roads).

We calculated that the original VW Beetle had a Social Energy Dust to Dust Cost of less than a nickle -- about 10 percent of the current lowest cost vehicle the Scion xB.

The problem is that most consumers would find the original Beetle to be a horrible car to own and demand far more complexity in their transportation (from power windows to air bags).

If you visit the www.CNWMR.com site and open the May 12 spreadsheet it will show you the cost between manufacturing and driving over the lifetime of the vehicle. The full report will get into this in detail and you are welcome to review that report when it is released to the public. I will add your name to the notification list.

As for funding, we self-funded this study. No outside company or organization was aware of our research until we first announced the findings. We are not charging anyone for the study and providing it free to our subscribers as well as the public.

I hope that answers at least some of your questions. Please feel free to contact me anytime you wish at this email address.

Regards,

Art Spinella
President
CNW Marketing Research, Inc.

Dear Mr. Spinella:

I understand that you promised many interested parties some justification of the estimate of 325 cents per mile for Toyota Prius. Today on your web site I see an impressively large speadsheet. But may we just get the the point here? I sum your colums J, L, O, Q, and AY for this vehicle to be $192,849. I also assume you are already aware that Toyota pays $200 for each of the notorious NiMH batteries returned to them, so let's summarize Toyota's financial responsibility for each of these vehicles as $193K.

My question to you is the following: As Toyota has already sold about 500,000 of these vehicles worldwide, at a wholesale price of about $15,000 each, a reasonable person will necessarily wonder where the other $90 Billion dollars might come from? Are you actually asserting that Toyota will post this loss, with much more to follow?

You may very well conclude from this question that I remain unsatisfied with your lack of justification of costs in those categories. I certainly hope that additional justification will appear soon on the CNW website. Your credibility in the automotive world should certainly be worth defending.
Sincerely,
Douglas A. Schaefer

Answer: Doug...

Thanks for your question and the time you took for working with the spreadsheet. Your points are good ones and worth discussing in more detail.

Perhaps most important, we are dealing solely with sales in the U.S. and only the energy cost of those vehicles. Toyota sold 107,897 Prius models in the U.S. in 2005. Actual gross wholesale charge to dealers was $19,016 for a total slightly over $2 billion.

Column AY is disposal cost. Second and third parties, not Toyota, are responsible for this and range from scrap yards to recycling plants to auto parts resellers. Consumers are compensated for part of this when they sell their vehicle and it eventually wends its way to scrap.

These second and third party buyers of vehicles turn a profit and are willing to pay for old vehicles because there is a profitable second-generation market for the materials. Toyota is out of the loop once the vehicle is purchased with the exception of compensating for warranty work.

Column Q -- transportation to dealer -- is paid for by the dealer and/or the vehicle's buyer through the transportation line on the MSRP or sticker. Once again, Toyota is compensated for this item.

Toyota's total cost for the 107,897 Prius vehicles sold was $4.8 billion including a very heavy charge for design and development, but not out of the ordinary for a ground-up new vehicle. The auto industry typically spends in excess of $1.5 billion for new vehicles. In Toyota's case, their hope -- being realized -- is that the early technological leadership in this development will eventually be used in other products and/or licensed to other manufacturers (which it is).

Hope that helps and again thank you for the email. Please feel free to contact me any time.

Best regards,
Art

An assortment of titles and companies who requested additional information:

Question: Could you please send me a spreadsheet of automotive efficiency as discussed in today's Automotive News.

We are medical product consulting design engineers, but lots of us are car freaks, too. By the way, I spent two years in graduate school--management & law at Willamette.

Regards,

Don Archambault
Director of Business Development
Omnica Corporation

Art,
Could you send over the "dust-to-dust" spreadsheet on models' energy efficiency? Your study sounds very interesting.

Best,
Chris Brown
Senior Editor
Business Fleet Magazine
Bobit Business Media
3520 Challenger St.
Torrance, CA 90503-1640

Art, please e-mail me the spreadsheet that breaks down cost by model.

Thanks again,
Charles R. Hill

Dear Mr. Spinella

I would greatly appreciate receiving the report or other information (spreadsheet?) that details the cost comparisons you made for different vehicles over their complete lifetimes (referenced by Ed Lapham in his Automotive News summary).

Many thanks
David M. Roessler
Business & Policy Group Manager, USCAR/FreedomCAR

Please send me a copy of the vehicle energy use spread sheet.

Curt Hartman
Hartman Motor Sales, Inc.
1711 South Main Street
Harrisonburg, VA 22801

In Edward Laphams Automotive News commentary, he suggested CNWR (Spinella)
would supply the spreadsheet detailing the assumptions and energy use coat
per model of various vehicles ...
Can you e-mail me this spreadsheet?
Thanks
Jim Powell
(GM)

From: Mack, Neil
Sent: Monday, May 15, 2006 12:32 PM
To: mailroom@cnwr.com
Subject: please send spreadsheet that breaks down car energy usage by model...
Importance: High

Thanks,
Neil Mack, CFA
AllianceBernstein

Good Morning Mr. Spinella:

I would like to request a copy of the hybrid model analysis which breaks down energy costs by model please.

My contact information is provided below.

Thank you very much in advance.

Sincerely,
Mark M. Duer
Market Development Manager
Visteon Corporation

From: Russell Datz]
Sent: Monday, May 15, 2006 11:10 AM
To: mailroom@cnwr.com
Subject: Hybrid vehicle costs

can you please send the report as advertised in Automotive News? thanks

From: Therese Langer
Sent: Monday, May 15, 2006 11:09 AM
To: mailroom@cnwr.com
Subject: energy costs per model

Sirs:
We would be very interested in the spreadsheet explaining your recent work on vehicle energy costs by model, as described recently in Automotive News.
Thank you.

Therese Langer
Transportation Program Director
American Council for an Energy-Efficient Economy
Washington, DC 20036

From: Chad Kelland
Sent: Monday, May 15, 2006 2:25 PM
To: mailroom@cnwr.com
Subject: Automotive News --- Spreadsheet Request

To Whom It May Concern:

After reading the article: *'The Big Picture Doesn't Favor Hybrids'* – Automotive News 5/11/2006, Boshart Engineering, Inc. would like to request a copy of the spreadsheet that breaks down the cost by model as indicated in the article.

Please reply using the below contact information.

Sincerely,
Chad
(Boschart)

I'd love to see the spreadsheet on this!

Joe Halovanic, AVP
Residual Risk Manager
US Bank

From: Brian Colianni
Sent: Tuesday, May 16, 2006 3:37 AM
To: mailroom@cnwr.com
Subject: Spreadsheet on total energy cost

I am interested in getting a copy of the per model cost of energy spreadsheet that was referenced in Ed Lapham's editorial via Automotive News.

Thank you.

Brian Colianni
Senior Vice President
Sales and Marketing
Mazda North American Operations

-----Original Message-----
From: KrKr
Sent: Tuesday, May 16, 2006 4:23 AM
To: mailroom@cnwr.com
Subject: Dust-to-Dust Study

Dear Madam, Sir:
Just now I was reading an article by Edward Lapham in Automotive News (May 11, 2006) in which he mentions the CNW Marketing Research study called 'Dust-to-Dust' in which many cars are compared by their energy use during the lifetime and manufacturing.

It sounds like a very interesting study and it would be great if you could send me an electronic copy of the study and the spreadsheet with all the data.

Thanks a lot in advance.
Kristian Kramer
The Netherlands

Could you please send me a copy of your spreadsheet on hybrid vehicle costs? Thank you very much.

Diane Austin
Industrialinfo.com
Sugar Land, Texas

Hello

I would be very interested in seeing a copy of your spreadsheet that breaks down cost by model. I am the Librarian for the Automotive Management degree Program at Georgian College in Barrie.

Thanks,

Dorothy Gagnon
Business Information
Library Commons
Georgian College

Re the following quote from Automotive News:

"Spinella says that if you're interested in the spreadsheet that breaks down cost by model you can request a copy by e-mailing mailroom@cnwr.com."

Please e-mail me a copy.

Gerry Malloy
Editor
Canadian Auto Dealer

Dear Mr. Spinella:

Please e-mail me the spreadsheet that breaks down cost per model.

Thank you
Leroy Elkins
Elkins Nissan

From: David Jones
Sent: Tuesday, May 16, 2006 10:04 AM
To: mailroom@cnwr.com
Subject: hybrid cost

Please send me a copy of the spreadsheet breakdown cost by model at David Jones Ga.31082 by snail mail. Thanks.

To Whom It May Concern:

I would like to request a copy of the energy cost per mile driven study CNW recently released. Please include the spreadsheet breakdown if at all possible. Thank you.

Regards,

- Tony
Tony Schum
Director, Economic Development
Greater Austin Chamber of Commerce

From: sandy herda

I am intrested in the spreadsheets that break down costs by model in the "Dust to Dust" article. I would appreciate if you could forward me a copy.

Thankyou
Sandy Herda

Can you send me a spread sheet breaking down the energy cost of vehicles. Thanks
Al Pettey
Adamson Motors

Hi! I just read Ed Lapham's article about the recent analysis of vehicle efficiencies completed by CNW Marketing Research. I would like to request a copy of the spreadsheet. Thanks!

Jeremy
Jeremy Claeson
District Manager - Inland Northwest
Western Region
Mazda North American Operations

I am interested in a copy of this spreadsheet that breaks down the cost per model.

Mike Taylor
Sr. Project Engineer
Powertrain Development
Ricardo Inc.

I saw a recent story by Edward Lapham of Automotive News on-line regarding CNWR's recent "dust-to-dust" energy cost analysis of motor vehicles. The article reported that a copy of the study spreadsheet with mode by model comparison could be obtained via this email address.

I would appreciate receiving a copy.

Thanks.
John Cabaniss
Director, Environment & Energy
Association of International Automobile Manufacturers

Chris Pritts Development Programs & Benchmarking Section
Ford Motor Co.
Dearborn, MI

Question: Thank you very much. Just for openers I handed out 4 copies and we got into a preliminary discussion that included owners of a C5 'Vette (me), a Prius, a Subaru Forester, Accord & Camry and a 1978 Suburban. I think this will generate exactly the discussion (and look at reality) that Art aimed for. And we should enter into this discussion.

Thanks again. But tell me, how did CNW get to Bandon?

Regards,

Don

Question: Hi, I'm the staff motoring correspondent for The Daily Telegraph in London, England and have been offered your dust-to-dust analysis as a feature from one of our freelancers. I'm deeply sceptical. Three questions: first how sensitive is your model to gas prices in the country in question? I'm sure you are ahead of me here, but if, say US gas prices got to $4 a US gal then surely the contribution of car useage to the dust-to-dust energy cost would be much higher and therefore the better economy of the hybrid might show it in a different light. Second, how do you know? I've covered this beat for 15 years and have interviewed the heads of Toyota and Honda about hybrid costs many times. All I can be actually very sure about here is that the development costs have been high and both companies are very sensitive on the subject. The idea they opened their books to you so you could trash the concept seem unlikely to say the least. Three: what do you think will be the D-to-D energy cost per mile of the Lexus GS450h bearing in mind you reckon the standard petrol engined GS 430 is $4.416 per mile? Oh and thanks (in advance) for your time. Andy E motoring correspondent The Daily Telegraph London PS: I trust I shall not be expected to pay for this answer...

Answer: Andy...

Thanks for the note.

First, and foremost, this is a North American analysis. Many of the 4,000 or so data points for each model would shift based on country of manufacture, country of sale and distribution-through-disposal infrastructure. For example, there is a large and very profitable scrappage industry in the U.S. which can dispose of the non-recyclable components with little difficulty.

For the analysis, we used $3 per gallon. As gasoline prices rise, clearly that has an impact on total Dust to Dust energy costs. More so, however, would be a hefty rise in oil prices. The issue is relative. The overall impact of even $5 per gallon gasoline is generally favorable to smaller engined vehicles and hybrids, but doesn't change the D-to-D figure significantly. (You can see the spreadsheet at www.cnwmr.com under "Energy Report").

As for sourcing of information, I too was on the auto beat as both a reporter and editor (Ward's). As a trained engineer, SAE was a long-time fascination as were the technical papers over the past 30 years. Gleaning data from published reports such as SAE papers and government agencies among literally hundreds of other sources is not simple, but quite efficient.

We also had the benefit of being able to spend three years to accumulate the data sets. For example, there have been dozens of studies conducted on the manufacturing energy issue by a wide assortment of government and private agencies. We were able to refine some of their data to assist in particular plant analysis.

I have to point out, however, that we did not intend to, nor do I believe we have, trashed hybrids. There is no doubt that the energy cost to produce and dispose of these vehicles vs. non-hybrids will narrow. But, the simple reality is complexity causes higher energy requirements for virtually all phases of a vehicle's lifetime from production to distribution to disposal. And actual hybrid fuel economy is significantly less than advertised, at least in the U.S.

I'm not sure you've seen the most recent (May 10) spreadsheet. If not, you can download it from www.cnwmr.com.

Feel free to contact me directly if you have further questions or comments. I relish the feedback.

Best,
Art Spinella

Question: Dear Art,
Thanks for the comprehensive reply. Your points are taken and I, too have found our weird and previously unknown stuff from obscure SAE papers. The last I heard re Toyota's hybrid development was that a lot of the R&D spend on hybrids was amortised over the Lexus brand rather than the Prius and another great chunk had been shovelled into the fuel-cell budget as the hybrid technology of the two projects has a fair bit of cross over.

I just wish we had your problems. We are paying £1 per litre here in the UK for fuel, although most of that is tax. Trouble is that buggers up the calculations still further. I once worked out the payback costs of a Ford Escape hybrid over here, which even as a personal import paid for itself in 18 months. In America that figure was about three years, if ever because of the opportunity costs.

Thanks again,
Andy E

Thanks very much for the assistance. This is an amazing study.

Joseph Agresta, Jr
Vice President
Benzel-Busch Motor Car Corp

Question: Hi Folks, My friend says there is no backup data for the dust to dust study. Is there anyway to validate your findings? Thanks, Rick New

Answer: Hi Rick...

Thanks for writing.

Your friend is incorrect.

In all, there are nearly 4,000 data points for each model in the Dust to Dust study. We have not released all of it yet, only the top-line findings. The full report is slated for release this month, timing dependent on editorial and legal review which is going on now.

In addition, we are adding car and truck models as we confirm the data we have on them. This will include Lexus RX hybrid and an assortment of diesel models.

Again, thank you for writing.

Best,
Art Spinella
President
CNW Marketing Research, Inc.

From: "paul davis"
To: <art@cnwmr.com>
Subject: SALVAGE PRICES

Question: I'LL TAKE EVERY ONE OF THOSE $1500 CARS I CAN MAKE $2000 MARGIN ON. I GET A FEW, MAYBE 6-10 A YEAR, OUT OF 300 OR SO.
HERE ARE JUST TWO OF THE MOST OBVIOUS PROBLEMS;
1) (AND 1a) THE SALVAGE POOL BUYERS FEES ON A $1500 CAR ARE ABOUT $250 CURRENTLY, WHICH COMES OUT OF MARGIN UP-FRONT. NO SURPRISE, DELIVERY CHARGES ARE GOING UP ALSO AND INTERNET MARKETING IS DRIVING PARTS PRICES DOWN. I BOUGHT A CAR AT THE LOCAL POOL MONDAY FOR $90.00, THE POOL CHARGES (NOT INCLUDING DELIVERY) WERE $85.00, BOUGHT ONE FOR $150.00, CHARGES $110.00, $200.00 CAR, $130 CHARGES. NO WONDER THE POOLS ARE DRIPPING CASH ALL OVER THE COUNTRY. IT IS THE MONEY THAT USED TO PAY US, OUR TAXES, EMPLOYEES, EXPENSES AND CAPITAL IMPROVEMENTS.

2) MOST OF THOSE CARS ARE GOING TO MEXICO OR OTHER COUNTRIES, SO BACK TO THE STORY THAT GOT ME ON THIS PATH. THE CARS WE USED TO PAY $500 FOR PLUS $20-$50 IN FEES, NOW COST $1500+, WITH MORE MILES ON THEM AND $250+ IN FEES. LET'S SEE.....LOWER CONTENT, HIGHER ACQUISITION PRICE, HELL YES WE ARE HAVING TO BE MORE EFFICIENT. I WOULD SUGGEST THAT THAT STRATEGY HAS BEEN JUST ABOUT EXHAUSTED. I KNOW I AM.

Question: I have read your materials with the greatest interest, since I am a writer in the environmental field. However, so far I have been unable to discern how you weight the different factors in your ratings. Is there a document you could send me to, that would explain for example how you weight manufacturing energy consumption (I presume you break this down into categories like mining, smelting, forging and stamping, as well as the more familiar auto manufacturing elements?). In general, I suspect your press release materials would seem more convincing if you indicated your methodology.

I am also curious about your handling of general company overheads, since some of the results only seem explicable if overheads are applied differentially.

Sincerely,
Ernest Callenbach

Appendix A

Knowing full well that some of the following data will be controversial, CNW Marketing Research, Inc. will be including a lengthy explanation of the data on its www.PurchasePathOnline.com site within the next week. This will include a Q and A section. **If you have any questions, please email them to Mailroom@cnwmr.com and they will be addressed on the Purchase Path site.**

The following is a summary of the data. For a complete set of spreadsheets showing "by model" energy cost-per-mile, see Document 1095 at our subscriber site: www.cnwbyweb.net

There have been numerous attempts at measuring the energy required to build vehicles. Some have gone so far as to label the data as "life cycle" energy cost, but failed to include important maintenance, scrappage, transportation and other related energy used over the true lifetime of a vehicle.

In 2003, CNW began what we expected to be a long research project to look at the real cost in terms of energy that a vehicle from conception to scrappage and/or recycling, what we call the "Dust to Dust" cycle.

That research was completed in the fourth quarter of 2005 identifying literally hundreds of variables and updated in February 2006 and applied to virtually all vehicles sold in the U.S. in calendar year 2005.

The results are, in some cases, provocative and may well be decried by certain individuals and groups because the data shows in hard dollar terms over the true life of a vehicle what are often considered "environmentally friendly" hybrid models actually have a greater impact on energy consumption than their non-hybrid counterparts.

Disclosure 1: First, and foremost, CNW did this research on its own and without sponsors of any sort and without financial assistance from any company, organization or group. Funding for the research came solely from CNW.

Disclosure 2: Employees, friends and families of employees as well as company vehicles run the gamut from Detroit 3 to Asian to European. Some score extremely low on the accompany tables, others extremely high. Most are middle-ground.

Disclosure 3: The research is NOT FOR SALE. It is solely for the information and use of subscribers. The data base used for the Excel spreadsheets is proprietary to CNW and will not be released. This is the ONLY RESEARCH that we perform that requires approval of re-use and pre-publishing approval of reports generated using this information. The general mass-market media is excluded from this provision.

Disclosure 4: Because of the nature and complexity of the research, CNW did NOT make calculations for years prior to 2005 so historical data is not available other than what individuals companies have claimed. However, CNW intends to perform this exercise on a regular basis adjusting for changes in manufacturing and technology in all aspects of the auto industry.

Disclosure 5: Additional data, other than what is presented on CNW Marketing Research, Inc.'s various web sites will remain unavailable to protect the proprietary nature of the data and the research methodology. General methodology will be made available at www.PurchasePathOnline.com. In time, further breakouts will be provided as CNW determines appropriate.

Disclosure 6: We have translated the energy cost to a dollar figure rather than using other technical (energy or electrical) terms in order to make the comparisons appropriate to the knowledge base of general consumers and non-technical industry and financial subscribers. Put simply: We wanted to use a real world framework that the general public could understand. "Cost per mile" was deemed the most easily understood.

Disclosure 7: All attempts have been made to assure accuracy of the data. However, no company, institution, organization or other group has been asked to judge the methodology or results prior to being published by CNW Marketing Research, Inc. Statistical accuracy is deemed to be plus or minus 8.6 percent.

Appendix B

<http://www.zapworld.com/>

May 4, 2006
Xebra Test Drive
/May 13, 2006 12-4pm

/Dear Art,/

/The Time Has Come!
Now is your chance to get your 'sneak preview' and test drive of one of the first production XEBRA 100% Electric Vehicle in the U.S. This XEBRA is the ONLY 100% Electric Vehicle that travels over 25 mph in the U.S.

Get Ready . . .
Prepare yourself for a whole new driving experience. XEBRAS do not attempt to behave like other vehicles. They are unique. You will soon find out when you test drive the XEBRA that they are quiet, yet agile. Imagine a world filled with silent XEBRAS instead of noisy internal combustion engines. On top of that they are a fun, compact and affordable All Electric Vehicle!

The Test Drive!
Plug ZAP! into your calendar for /Saturday//, May 13th/. We invite you and your associates to test drive the XEBRA, offer your feedback to assist us in future versions, as well as order your own special addition XEBRA.

Other Electric Vehicles will be available for testing as well.

ZAP! In the News
10 Reasons to ZAP!
About ZAP! <http://www.zapworld.com/about/index.asp>

Appendix C

Saturday, April 08, 2006
Toyota poised to become the world's largest automaker
Industry experts praise the company's efficiency, flexibility, quality control and, most importantly, foresight
Anthony Faiola / The Washington Post
http://www.detnews.com/apps/pbcs.dll/article?AID=/20060408/AUTO01/604080343/1148

Satoshi Ogiso was in his office redesigning Camrys and Tercels when the young auto engineer was suddenly ordered to switch gears and join a secret mission "to come up with a whole new car for the 21st century."

Toyota Motor Corp.'s top management, Ogiso said, had read the wind. Believing that higher oil prices and the rise of eco-conscious consumers would spark surging demand for super-efficient autos, they ordered up what would become the prototype for the Toyota Prius.

Analysts say the foresight and planning that went into the development of the world's first mass-produced hybrid underscore how Toyota has managed to leave the struggling U.S. automakers in the dust -- and why it is likely to stay ahead for years to come.

"The early development of the Prius put Toyota at least two years ahead of the Big Three in one of the fastest-growing car segments," said Noriyuki Matsushima, managing director at Nikko Citigroup Ltd. in Tokyo.

In the midst of massive layoffs and plant closures, General Motors and Ford are struggling for survival. Meanwhile, Toyota is projected to post record profit this year after nearly doubling production and opening seven factories over the past five years.

Toyota has avoided layoffs or major labor disputes for more than half a century while maintaining an industry edge in cross-training line workers to build multiple cars on the same assembly lines. Inside Toyota's sprawling Tsutsumi plant here -- one of two in Japan that make the Prius -- workers produce seven models on two assembly lines, changing tasks every two hours.

The relentless push for efficiency often takes shape in small ways. Two years ago, the company came up with a new process in which parts for specific models were presorted into blue boxes that travel down the line as each car is assembled. Though low-tech and inexpensive to put into effect, it significantly sped up the product line and saved space by doing away with the need for workers to seek out different auto parts from storage bins. It was one of roughly 600,000 small improvements Toyota makes annually.

"Toyota is the Tiger Woods of flexibility and efficiency; they've got everybody a few strokes behind," said Ron Harbour, head of Harbour Consulting, publisher of an annual auto industry productivity report. "Often, it's nothing that makes you sit back and go 'wow.' They're little things, thousands of little things that add up to a huge advantage."

Analysts say the Prius marks an inventive milestone for Toyota. Although it accounts for only a tiny fraction of the record 9 million vehicles Toyota expects to produce this year, the Prius was an atypical risk for a company that has become more known for quality and consistency than innovation.

Toyota has been toying with hybrid engines for the past 20 years. But the company began to seriously pursue a mass-producible hybrid in 1993. Ogiso, 45 years old and now the chief engineer on the third-generation Prius still under development, said the edict came from Eiji Toyoda, the patriarch of the Toyota family who headed the company until 1994.

Ogiso said Toyoda had grown increasingly concerned that gas-engine auto manufacturing would eventually become a sunset industry given the limits of global oil supplies and increasing pressure to curb emissions. Focused more on a long-term advantage than the short-term gains that U.S. automakers are under pressure from Wall Street to produce, Toyota put hundreds of engineers to work on creating a new engine that would double average gas mileage and cut emissions by 80 percent.

Conventional engines were quickly ruled out. "We found that the only way to achieve that goal was building a whole new type of car," Ogiso said.

In the United States, an unconventional car called for unconventional marketing, and Toyota began selling the Prius via the Internet to generate a buzz. It worked.

Some credit the success of the Prius to lucky timing -- sales took off just as gas prices were skyrocketing. But many who initially scoffed at the idea -- including General Motors and Ford -- have become true believers. Both companies have rolled out hybrids of their own.

APPENDIX D

Saw your piece on hybrid cars. I got similar numbers on using aluminum to Increase fuel mileage from 25 mpg to 40 mpg. Car has to be driven 10 years to break even on the fuel required to make the aluminum. Calculation is much easier to do than trying to track all the stuff that goes into a hybrid car. Analysis follows.
Sincerely, William Ernest Schenewerk, Ph.D.

Los Angeles Times, 01222006, Page A15
Re: John Brownstein, U.S. Energy Policy Ought to Send Iran a Lasting Message.

An energy policy document that does not contain the N-word is worse than useless. Minus the breeder reactor, renewable energy is by definition anything that is useless. Atomic power is the only available energy option that can make a dent in the global warming problem or make us less vulnerable to fuel supply disruption. Each atomic power plant delays CO2 doubling one week. Atomic power plants refuel every 2 years. Billions spent worldwide on "alternative" energy over that last three decades has yielded nothing.

If wind energy were economic, ships would still use sails. It is easy to show that windmills do not save any natural gas. The intermittent nature of wind energy requires instant-start backup generation. CA ISO assigns wind energy 20% availability. Running 30% efficient backup power 80% of the time uses the same amount of natural gas as does running 40% efficient combined-cycle 100% of the time. 0.8 divided by 0.3 is greater than one divided by 0.4. I win.

That leaves using less fuel for the same economic activity. I will analyze getting 40 mpg in a full-size car. I ignore the cold-engine problem. That can be mitigated if everyone orders the new car with a $20 block heater option. A block heater creates a real plug-in hybrid.

Significant vehicle mileage improvements can only be obtained by weight reduction. EPA city mileage is roughly 70000 divided by vehicle weight in pounds, regardless of manufacturer. Combined city and highway mileage is roughly 90000 divided by vehicle weight in pounds.

A Standard steel Camry or Monte Carlo is 1.5 tonnes (3307 lb) and gets 90000/3307 = 27 mpg combined city/highway mileage. A one tonne (2204.6 lb) all-aluminum vehicle would get 90000/2204.6 ~ 40 mpg after the motor is hot. A steel hybrid compact also gets 40 mpg combined city/highway and weighs approximately 1.7 tonnes. It is far better to weigh 1 tonnes than 1.7 tonnes when passing the ice cream truck.

In this calculation: 1 tonne (1000 kg) aluminum is substituted for 1 tonne steel causing vehicle weight to drop from 1.5 tonnes to 1.0 tonnes. Producing a tonne Al uses 1/2 tonne carbon in an electrochemical reaction. The electrochemical reaction takes place in an electric furnace that requires 70 GJe (gigajoules electric power) to produce each tonne aluminum. The 1/3 tonne carbon used to make the steel is not deducted because Washington State aluminum replaces Brazilian pig iron.

The following calculation is simplified by assuming the 1/2 tonne carbon used to smelt 1 tonne Aluminum comes from gasoline. Gasoline is roughly isooctane: C8H18. C8H18 density is roughly that of 70 API gasoline (roughly 700 kg/m^3). A barrel is 0.16 m^3 and isooctane molecular weight is 114. Result is a barrel gasoline, 42 gallons, is 1.0 kg-mole-C8H18. Now it is easy to go from SI units to gallons gasoline. The barrel gasoline contains 8-kg-moles carbon, the "C8" part. 1/2 tonne carbon, 42 kg-moles carbon, is contained in roughly 5 kg-moles gasoline. This is roughly 5 barrels gasoline or 210 gallons gasoline.

Gasoline HHV (Higher Heating Valve) is 5.46 GJt-HHV/kg-mole-C8H18, or roughly 5.46 GJt/barrel. The 70 GJe used power the electrochemical reaction to make 1.0 tonne Al could be produced by burning gasoline to make electricity. Assuming a 33% overall thermodynamic efficiency (3 GJt/GJe) Gasoline requirement to produce 1 tonne aluminum is 70 GJe/tonne-Al times 3 (GJt/GJe) divided by 5.46 GJt/barrel, or 38 barrels/tonne-Al. Total gasoline for the ton aluminum is (5 barrels reaction/tonne-Al reaction + 38 barrels fuel/tonnne Al) * 42 gallons/bbl = 1806 gallons gasoline/tonne-Al.

If the previous car (Chevrolet Monte Carlo or Toyota Camry) weighed 1.5 tonnes its city/highway average is 90000/3310 lbs or 27 mpg. Notice substituting 1 tonne aluminum for steel only reduces weight 1/2 tonne, making the new car weigh 1.0 tonnes.

If 1806 gallons gasoline is used to make the tonne aluminum, I can calculate break-even mileage. If I drive both cars 150000 miles, the 1 tonne car uses 3750 gallons gasoline at 40 mpg and the 1.5 tonne Monte Carlo uses 5556 gallons at 27 mpg. Difference is 1806 gallons, the gasoline required to make the tonne aluminum. If the aluminum is made using NUCLEAR POWER and 210 gallons gasoline, then break-even is 17400 miles, 1 year driving.

Are your eyes glazed over yet? I believe I have made my point: Aluminum cars made with atomic power must be driven one year before there is a net improvement in the environment. Aluminum cars made from burning fossil fuel must be driven a decade before there is a net fuel savings.

I submit that the above reasoning applies to all "energy conservation" policy options. Never mind the first law of Thermodynamics is: energy is always conserved. The real operative is to conserve free energy. Or at least get more done while wasting it. Free energy is an obscure thermodynamic concept that pertains to avoiding entropy accumulation. Think in terms of money being converted to shoes that accumulate in the closet.

Subcompact cars fail in the market. Henry Ford discovered this the hard way when the Model T lost out to the Chevrolet. The Model T was actually killed by the used Oldsmobile. Same thing happened to the Fiat 850 and Yugo (Fiat 128). Honda and Toyota survived by doubling their mass. People would rather own a used mid-sized car than a new subcompact. The operative here is: owning more cylinders than doors. The owner of a large old car offsets higher fuel cost with only buying liability insurance. When the car gets 20 years old, the Smog-Crusher pays a grand for it.

Transportation uses half of all energy. Airliners already get 50 seat-miles to a gallon of jet fuel. Ocean vessels need speed to avoid weather and track accurately. The above analysis can probably be modified and applied all forms of energy consumption. There is also "Rebound Effect" pervaded by Fatih Birol, OECD, that erases a significant fraction of engineered fuel savings.

The only viable energy strategy is to switch all stationary energy plants to atomic power. Hot water and space heating is done with heat pumps. That leaves plenty of coal, oil and natural gas for transportation and chemicals. Phosphate fertilizer byproduct uranium is adequate if the breeder reactor is deployed.

With the exception of advocating rapid atomic power deployment, coherent energy policy absolutely requires understanding chemistry, isotopes and thermodynamics. That invariably requires an earned degree in chemistry, physics, or engineering. Nobody advocating energy policy seems to have a clue as to how heat pumps work. We have wasted 30 years hearing coffee-shop leftist squawking: "Awk! Eeek! Conservation! Conservation!" Meanwhile the chance to stop CO2 at 1.5 times preindustrial was thrown away three decades ago.

APPENDIX E

Freakonomics

A Star Is Made

By STEPHEN J. DUBNER and STEVEN D. LEVITT
Published: May 7, 2006

Anders Ericsson, a 58-year-old psychology professor at Florida State University...studied nuclear engineering until he realized he would have more opportunity to conduct his own research if he switched to psychology. His first experiment, nearly 30 years ago, involved memory: training a person to hear and then repeat a random series of numbers. "With the first subject, after about 20 hours of training, his digit span had risen from 7 to 20," Ericsson recalls. "He kept improving, and after about 200 hours of training he had risen to over 80 numbers."

This success, coupled with later research showing that memory itself is not genetically determined, led Ericsson to conclude that the act of memorizing is more of a cognitive exercise than an intuitive one. In other words, whatever innate differences two people may exhibit in their abilities to memorize, those differences are swamped by how well each person "encodes" the information. And the best way to learn how to encode information meaningfully, Ericsson determined, was a process known as deliberate practice.

Deliberate practice entails more than simply repeating a task — playying a C-minor scale 100 times, for instance, or hitting tennis serves until your shoulder pops out of its socket. Rather, it involves setting specific goals, obtaining immediate feedback and concentrating as much on technique as on outcome.

Ericsson and his colleagues have thus taken to studying expert performers in a wide range of pursuits, including soccer, golf, surgery, piano playing, Scrabble, writing, chess, software design, stock picking and darts. They gather all the data they can, not just performance statistics and biographical details but also the results of their own laboratory experiments with high achievers.

Their work, compiled in the "Cambridge Handbook of Expertise and Expert Performance," a 900-page academic book that will be published next month, makes a rather startling assertion: the trait we commonly call talent is highly overrated. Or, put another way, expert performers — whether in memory or surgery, ballet or computer programming — are nearly always made,, not born. And yes, practice does make perfect.

"I think the most general claim here," Ericsson says of his work, "is that a lot of people believe there are some inherent limits they were born with. But there is surprisingly little hard evidence that anyone could attain any kind of exceptional performance without spending a lot of time perfecting it."

Ericsson's conclusions, if accurate, would seem to have broad applications. Students should be taught to follow their interests earlier in their schooling, the better to build up their skills and acquire meaningful feedback. Senior citizens should be encouraged to acquire new skills, especially those thought to require "talents" they previously believed they didn't possess.

And it would probably pay to rethink a great deal of medical training. Ericsson has noted that most doctors actually perform worse the longer they are out of medical school. Surgeons, however, are an exception. That's because they are constantly exposed to two key elements of deliberate practice: immediate feedback and specific goal-setting.

Stephen J. Dubner and Steven D. Levitt are the authors of "Freakonomics: A Rogue Economist Explores the Hidden Side of Everything." More information on the research behind this column is at www.freakonomics.com.

APPENDIX F

$175,000? No problem

Michiganders load up on premium cars
May 7, 2006
BY JOE GUY COLLIER

The Bentley, which cost $175,000, has a massive twin-turbocharged 12-cylinder engine, handcrafted leather interior and a paint job so thick you'd think you could dip your hand in it.

"I like something that stands out," said Jerome Scott, 56, a national vice president with **AmeriPlan USA Corp.**, which sells supplemental health benefits. "I like the idea of something being exclusive."

Despite tough economic conditions overall in Michigan, sales are strong for super-premium brands -- cars costing $150,000 or more.

On May 17, the **Suburban Group** in Troy will officially open a new showroom for Lamborghini, the iconic Italian sports car whose models range from $175,000 to $320,000.

The addition of Lamborghini comes after strong demand for other high-priced cars. The Suburban Group sold 89 Bentleys in 2005, 20 more than the year before. It also sold 16 Rolls-Royces, two more than in 2004.

Mercedes-Benz of Bloomfield Hills sold four Maybachs last year, up from two in 2004. Those aren't big numbers until you consider the average Maybach price tag: $400,000.

Michiganders traditionally have shied away from ultraluxury vehicles, said Matthew Vazana, general sales manager over the Suburban Group's premium brands.

In recent years, though, local car buyers have been attracted to the performance and craftsmanship of the premium brands, Vazana said. These cars truly are set apart from any mass-produced vehicle. Bentley boasts that it spends five to seven days on the paint process and 16 hours hand-stitching the steering wheel.

Customers also have moved upstream as brands such as Mercedes and BMW, which now have models at about $30,000, become more common, Vazana said.

"They want a car that is not seen on every single corner," he said. "I call it the valet factor. If you pull up and you get out of a Bentley, that car is getting parked front and center."

The rest of the U.S. market also is seeing increased interest in these cars. Bentley's U.S. sales increased 47% last year to 3,654, and Ferrari's U.S. sales were up 13% to 1,477, according to **Autodata Corp**
.
Sales are soaring as men between 45 and 65 years old -- whose children are done with college -- are finding themselves with more disposable income, said Tom duPont, publisher of the duPont Registry, a catalog for high-end vehicles.

"You're seeing a predominant wave of baby-boomer men who have looked at high-end cars all their lives and now are not paying college tuition anymore," duPont said. "If you have two kids in college, that's one" Rolls-Royce Phantom.

The Scotts, who bought their Bentley last February, said they're pleased with the purchase. The cost was high, they admit. Their Jaguar and Lexus combined didn't cost as much.

"If you can stand up after seeing the price tag, you pass the test," Debera Scott said.

But it's been worth it, they said. The styling is distinctive and the lines are flawless.

"It's a stunner," Jerome Scott said. "Everyone wants to look at it."

And the performance is phenomenal. The 12-cylinder engine pulls the car forward with ease. "You step on the gas and hit 60 m.p.h. in a heartbeat," Jerome Scott said.

The only question now for the Scotts is whether to have one Bentley or two. They've ordered a second one that should come in later this year and haven't decided whether they will keep or sell the Bentley they have now.

APPENDIX G

Texans Fall Out of Love With Trucks, SUVs After Gasoline Soars

Trucks and sport-utility vehicles account for three of every four trade-ins at Gillman Honda and Gillman Mitsubishi in San Antonio, said Mike Basham, a used-car manager. Customers want fuel-efficient cars instead, he said.

Many residents are buying economy cars, including gasoline- electric hybrids, as gasoline approaches the record reached last year after Hurricane Katrina. The shift in Texas, where pickup- truck ownership is the highest among the eight largest U.S. states, may hurt the country's automakers as well as dealers.

GM, Ford Motor Co. and the Chrysler unit of DaimlerChrysler AG make a profit of $3,000 to $8,000 on each full-sized truck and SUV they sell, said Dennis Virag, president of Automotive Consulting Group Inc. in Ann Arbor, Michigan. They are lucky to break even on economy cars, he said.

One in four Texas drivers owns a pickup, according to Census Bureau data from 2002. The state accounts for one in every seven sales of Ford's F-Series pickups, the top-selling vehicle in the U.S.

``It's a large, heavily populated state, and consumers there like their trucks,'' Virag said. ``They like big trucks.'' Texas is the second-largest state by area and population, with 268,581 square miles and 22.5 million people, according to U.S. Census Bureau data.

The price of fuel is cutting into demand, said Jerry Reynolds, a former owner of Prestige Ford in Garland, Texas. ``It's on everybody's mind,'' he said in an interview on May 11, four days before selling his stake in the dealership. Prestige was once the largest U.S. retailer of F-150 pickups.

In the five months after Katrina struck, full-sized SUVs sat on Texas lots for an average of 132 to 147 days before they sold, according to the Power Information Network of researcher J.D. Power & Associates. The average climbed from 89 days early last year. For all vehicles, the average has fallen to about 60 days from 70 early in the year.

GM's Chevrolet, Ford and Chrysler's Dodge had declines of 6.5 percent to 13 percent in Texas truck sales last year, R.L. Polk & Co. data show. Across all nameplates, sales fell 4.3 percent even as total new-vehicle sales rose 1.5 percent.

Trucks and SUVs accounted for 61 percent of new-vehicle sales in Texas last year and through the first two months of 2006, down from 64 percent in 2004.

Smaller vehicles are on an upswing. Sales of Toyota Motor Corp.'s Prius hybrid and Yaris subcompact helped lift sales at Fred Haas Toyota World in Spring, Texas, to a record in April, said Vic Vaughan, general manager.

The Prius, a mid-sized sedan, has more than tripled its market share in Texas since 2004 to 1.2 percent, according to the Polk data. The Yaris, a top seller in Europe that gets 40 miles (64 kilometers) per gallon on the highway, arrived in March at U.S. dealerships.

``When you're getting your nose bloodied at the gas pump the way Texans and Americans are right now, it makes it easier to debut a car as fuel-efficient as the Yaris,'' Vaughan said.

Honda Motor Co. added a small car, the Fit, to its U.S. lineup in April.

``I just barely got a glimpse of one,'' said David Kemp, Gillman Honda's general manager. ``I've gotten in 10 or 15, and they sold right when they hit.''

Nor has he been able to keep Civic and Accord hybrids on the lot. ``I don't have enough of them and can't get enough of them,'' he said. ``I don't think anybody was ready for $3 gas.''

Hybrid versions of GM's Texas-made Chevrolet Tahoe and GMC Yukon SUVs are scheduled to debut in 2007, and the automaker promises a 25 percent increase in fuel efficiency. Chrysler's Dodge Durango, using the same technology, is due in 2008.

Texans Fall Out of Love With Trucks, SUVs After Gasoline Soars

APPENDIX H

Now you can get 0% financing through Ford Credit for up to 60 months on the purchase of a new 2005 or 2006 Ford Escape Hybrid.

If you meet the requirements, you can qualify for a federal income tax credit of $2,600 on the purchase of a new Ford Escape Hybrid FWD ($1,950 on Hybrid 4WD). That's a credit, not a deduction. Your tax obligation may be reduced by the award given!

Complete information is available at www.fueleconomy.gov.

*Based on manufacturer's estimates; certification awaiting approval from the IRS. Consult your tax advisor for the amount of credit you can claim. This information is provided by Ford Motor Company as a service, not as tax advice.

APPENDIX I

Thursday, April 27, 2006 - Page updated at 12:00 a.m.

Lawmakers talk gas, drive away in SUVs

By Dana Milbank
The Washington Post
http://seattletimes.nwsource.com/text/2002955908_milbankgas27.html

She then hopped in a waiting Chrysler LHS (18 mpg), even though her Senate office was one block away.

Sen. Charles Schumer, D-N.Y., also drove the one block to and from the gas-station news conference, albeit in a relatively efficient Hyundai Elantra. He posed in front of the fuel prices and gave them a thumbs-down. "Get tough on big oil!" he demanded of the Bush administration.

At about the same time, House Republicans were meeting in the Capitol for their weekly caucus (Topic A: gas). The House driveway was jammed with cars, many idling, including eight Chevrolet Suburbans (14 mpg).

Sen. Lisa Murkowski, R-Alaska, made a plea for conservation. "We have to move quickly to increase our fuel efficiency," she urged.

But not too quickly. After lunchtime votes, senators emerged for the drive across the street to their offices.

Sen. John Sununu, R-N.H., hopped in a GMC Yukon (14 mpg). Sen. Jim DeMint, R-S.C., climbed aboard a Nissan Pathfinder (15). Sen. Ben Nelson, D-Neb., stepped into an eight-cylinder Ford Explorer (14). Sen. Dianne Feinstein, D-Calif., disappeared into a Lincoln Town Car (17). Sen. Edward Kennedy, D-Mass., met up with an idling Chrysler minivan (18).

Next came Sen. Bob Menendez, D-N.J., greeted by a Ford Explorer XLT (14). On the Senate floor Tuesday, Menendez had complained that Bush "remains opposed to higher fuel-efficiency standards."

Also waiting: three Suburbans, a Nissan V8 Armada, two Cadillacs and a Lexus. The greenest senator was Richard Lugar, R-Ind., picked up by his hybrid Toyota Prius (60 mpg). His Indiana counterpart, Democrat Evan Bayh, was met by a Dodge Durango V8 (14).

If the politics of gasoline favor Democrats at the moment, the insincerity is universal. A surreptitious look at cars in the senators-only spots inside and outside the Senate office buildings found an Escort and a Sentra (super-rich Wisconsin Democrat Herb Kohl's spot had a Chevy Lumina), but far more Jaguars, Cadillacs and Lexuses and a fleet of SUVs made by Ford, Honda, BMW and Lexus.

A sampling of senators' and staff cars parked along Delaware Avenue Northeast found that those displaying Democratic campaign bumper stickers had a somewhat higher average fuel economy (23 mpg) than those displaying GOP stickers (18 mpg).

A fuel-efficiency rating could not be found for the 1970s-era Volkswagen "Thing" owned by Sen. Richard Burr, R-N.C.

APPENDIX J

Sympathy as Hard to Find as Oil

By KATE PHILLIPS and JULIE BOSMAN
Published: May 3, 2006

It's not for want of trying. In their latest counteroffensive to that type of demonization, the big oil companies and their trade groups have stepped up their own campaigns, spending millions of dollars on television, radio and newspaper advertisements in hopes of blunting the reaction.

The oil companies, like Gen. Ulysses S. Grant, are certainly prepared to fight it out all summer. Last year alone the top 10 oil companies spent more than $30 million on their lobbying battalions.

"We can no longer be fortress America," said Red Cavaney, president of the American Petroleum Institute. "I think we, like other industries, have been slow in understanding the need to communicate what we're doing to the public and opinion makers."

For its part, the petroleum institute has brought on Blue Worldwide, the advertising arm of Edelman Public Relations and the Hawthorn Group. As oil industry profits soared, it started a campaign of full-page newspaper ads, arranged for dozens of op-ed articles, and produced television and radio commercials in an effort to explain why gas prices have risen so much.

The campaign has cost the institute more than $20 million over the last several months, though this is minuscule when set against the profits most oil companies have been making. Even BP, the only major to report a drop in earnings for the quarter, still had net income of more than $5 billion. Chevron said profit rose 49 percent in the quarter.

The trade group, along with others representing refineries and independent producers, has developed a set of talking points: the impersonal forces of demand have outstripped supply, particularly as China's industrial expansion has added a new force to the global economy; oil industry profits are not outsize by the standards of other major industries; Western oil companies have only a limited share of the crude oil market, which is now dominated by OPEC and other oil-producing nations.

"I'm not sure what they can do about it," Senator Cornyn said of the industry's image.

On another front, smaller independent natural gas and oil producers, which are centered in the oil-patch states of Texas, Louisiana and Oklahoma, are hoping that their hometown image and grassroots connections will help quell the fever.

"The oil and natural gas industry is very misunderstood by the public and, from what we've seen over the past week, by Congress," said Jeff Eshelman, vice president for public affairs at the Independent Petroleum Association of America, which lobbies on behalf of its 5,000 large and small independent oil and natural gas producers.

"Congressional efforts have really been misguided: they've done nothing to lower gasoline prices; they've done nothing to increase supplies."

But industry and trade officials concede that lawmakers are in no mood right now to contemplate long-term solutions to today's energy situation.

Both industry officials and Congress recognize the potency of gas prices as a lever at the polls. The oil industry is a powerful campaign donor, with more than $1 million being donated to federal candidates in 2005 and the first three months of this year by the top 10 oil industry political action committees, largely to

Republicans, according to the PoliticalMoneyLine, an online Web site that compiles finance data.

"This is an election year and our organization does have a political action committee," Mr. Eshelman said. "We are making it one of our priorities to raise funds for the political action committee and we will be involved in the upcoming elections."

APPENDIX K

Car buyers will give up size, not power, for mpg
CNNMoney.com/KBB.com survey says car shoppers unwilling to give up performance or luxury labels to save gas.
May 8, 2006: 1:58 PM EDT

Almost a quarter of car shoppers would be willing to sacrifice size, performance, prestige and even pay more money to buy a car that got five more miles per gallon, according to a survey conducted by Kelley Blue Book's KBB.com Web site at the request of CNNMoney.com.

The survey asked car shoppers, defined as those who said they intended to purchase a vehicle within the next six months, which of four trade-offs they'd be willing to make when selecting their next vehicle if it would mean an extra five miles per gallon. Respondents could also choose "all of the above."

About half of the respondents said they would be willing to make certain specific trade-offs to get that kind of mileage gain.

Twenty-seven percent of respondents said they would be willing to buy a smaller vehicle to save that much, making that the most popular response. Less than half that many, 12 percent, said they'd be willing to buy a less prestigious brand of car to get five more miles per gallon.

Only eight percent said they would be willing to get an engine with 100 less horsepower.

Another nine percent said they would be willing to pay more money to get that kind of extra fuel mileage. That response indicates a willingness among those respondents to purchase a hybrid vehicle or other type of vehicle that would get increased fuel mileage without sacrificing size or power.

Roughly 22 percent, however, said they would be willing to do "all of the above" to get an extra five miles per gallon. The same percentage indicated they wouldn't be willing to sacrifice anything.

Overall, 629 car shoppers completed the survey which has an estimated two to three percent margin of error.

What would you give up to get 5 mpg?

Â Â Â Â •Â Â Â Â 100 horsepower orr more? -- 8 percent

Â Â Â Â •Â Â Â Â Vehicle size (steep down in vehicle class/size) -- 27 percent

Â Â Â Â •Â Â Â Â Brand cache or peerceived status -- 12 percent

Â Â Â Â •Â Â Â Â Pay more money --- 8 percent

Â Â Â Â •Â Â Â Â All of the above -- 23 percent

Â Â Â Â •Â Â Â Â Not willing to saacrifice anything -- 22 percent

APPENDIX L

Stuck in the Past: Why Managers Persist with New Product Failures
Eyal Biyalogorsky, William Boulding, & Richard Staelin

Despite this, much research suggests that managers tend to stay committed to courses of action even in the face of negative feedback that indicates theÂ action's inadvisability. Most of the extant literature posits that this tendency to stick with a losing course of action is due to the manager being publicly involved with the initial decision to move forward. For example,Â managers might stay committed becauseÂ they do not want to â€œlose faceâ€ù or becauseÂ they distort any new information to be in line with his or her initial decision. The author refer to the former behavior as â€œdecision involvement inertiaâ€ù and the latter behavior as â€œdecision involvement distortion.â€ù

In addition to these explanations, the authors propose a third possible mechanism that underlies escalation behavior. This explanation has nothing to do with involvement with the initial decision but instead points to the role of initial beliefs about the viability of the venture, independent of any involvement with the initial decision. Specifically, the authors suggest that when the manager is exposed to new, negative information, the manager distorts and weights this new information to conform to his or her initial positive beliefs. They refer to this behavior as â€œbelief inertia distortion.â€ù

To test these differing accounts of escalation behavior, the authors conduct an experiment in which, in some conditions, participants were asked to make an initial product launch decision and then reevaluate this decision after receiving negative information. In other conditions, participants were exposed to the initial information leading up to the first decision but were not asked to make an initial decision, and all beliefs formed by these participants were kept private.

The results show that involvement with the initial decision, either through decision involvement inertia or decision involvement distortion, is not a necessary condition to induce commitment to a losing course of action (i.e., escalation bias). Rather, the authors find that the driving force behind escalation behavior is the failure to appropriately update initial positive beliefs in the face of negative new information, independent of any involvement with the initial decision.

This understanding of how escalation occurs provides the groundwork necessary for designing systems to help mangers avoid the trap of escalation bias. In particular, if the driving force behind escalation behavior is biased belief updating (as is found to be the case in this study), strategies that reduce decision involvement inertia by reducing the need for self-justification or rationalization of prior decisions will not eliminate escalation bias. Rather, it might be more effective to take the initial positive beliefs â€œout of playâ€ù because these initial beliefs lead to biased belief updating. For example, it might be good to â€œdecoupleâ€ù decision makers from subsequent decisions. Note, however, that the new decision maker must be decoupled not only from the original decision but also from the original evaluation process that produces initial positive beliefs. Another possible solution to avoid escalation bias is to implement predetermined stopping rules. Still, because evidence suggests that managers routinely overrule self-imposed stopping rules, such guidelines should be enforced by a different manager uninvolved with the original evaluation process. In summary, this research suggests that solutions to the escalation problem may be more subtle and difficult to implement than previously believed.

APPENDIX M

Wednesday, May 3, 2006
Gas prices lift small-car sales
Most automakers see truck, SUV results decline
By Robert Schoenberger

At Ford, sales of the Louisville-built Explorer fell 42 percent compared to April 2005, despite the sale of 2,500 Sport Trac pickup versions of the vehicle.

The small Escape was the only Ford SUV to post a sales gain. The 6.2 percent increase came entirely from the gas-electric hybrid version of the vehicle.

Pickup sales were also down last month, with the F-Series line off 9.3 percent. F-Series sales include Super Duty trucks built at the Kentucky Truck Plant on Chamberlain Lane.

Officials at Ford and other automakers said consumers shopped for more fuel-efficient vehicles in April in response to rising fuel prices. Three new small vehicles, the Dodge Caliber, the Toyota Yaris and the Honda Fit, all sold quickly during the month, totaling 21,421 in sales.

"The market for lower-priced, higher-mileage vehicles is showing strength, as are hybrids," said Toyota Motor Sales President Jim Press. "Record oil prices have a way of reminding us how close to the cliff we're living."

"The Fusion, (Mercury) Milan and (Lincoln) Zephyr continue to surprise us on the upside," Al Giombetti, president of Ford, Lincoln and Mercury marketing and sales, said in a statement. "These new fuel-efficient cars are helping our dealers to retain owners and capture new ones."

Pipas said Ford may try to stimulate SUV sales later this year by offering incentives on the Explorer and other vehicles. But given the market conditions, he said he doubts there will be much response.

"To go beyond the incentive levels on the truck-based SUVs at this point is like pushing on a string," Pipas said. "You can't take consumers to where they don't want to go."

Toyota saw the biggest gains from the shift to smaller vehicles, with sales up 4.5 percent during the month. Strong sales of the Yaris and the Corolla and Scion xA compact cars helped overcome a 10.7 percent decline in the Avalon sedan and a slight drop for the Camry. During the month, Toyota sold 86 hybrid Camry models.

Toyota will shift production of the hybrid Camry to Georgetown, Ky., this summer. The automaker also makes the Avalon in Georgetown.

DaimlerChrysler's Chrysler Group saw sales decline 8 percent, as the Dodge Caliber was unable to offset steep declines in demand for Jeep and Dodge SUVs.

Nissan sales also fell in April, led by a 34.6 percent drop for the Quest minivan. Nissan's small vehicles, the Sentra compact car and Frontier compact pickup, both saw sales climb.

At Honda, sales were up 2.6 percent as increases for the Fit and Civic small cars offset declines in the Accord sedan and Element SUV.

APPENDIX N

Backseat Driver
Jerry Flint, 05.16.06, 6:00 AM ET

General Motors likes to brag about its energy-efficient cars and trucks, but most of us do not think much of the effort. Even the president of the United States has criticized Detroit, and that means GM. Yet, in its just-issued annual report, GM tells stockholders, â€œWe have a good story to tell …â€ù

What is the good story? Here are some highlights of the message:

--That GM (nyse: GM - news - people) offers more vehicles here with an Environmental Protection Agency highway mileage rating of 30 or more miles per gallon, which is â€œmore than any other automaker.â€ù

--GM has nine models that can run on an 85% ethanol, 15% gasoline mixture (E85), and has built 1.5 million flexible-fuel vehicles.

--The company has a hybrid bus running and has been selling a light hybrid pickup truck for two years.

--A low-cost hybrid system is coming for the Saturn VUE sport utility vehicle, which will have a base sticker of less than $23,000.

--GM also promises that, starting with the 2008 Chevy Tahoe, its next generation, two-mode hybrid system, developed with DaimlerChrysler (nyse: DCX - news - people) and BMW, will go into production.

--The company also has the belief that over time it can commercially develop a miracle propulsion system, the fuel cell, that will not need gasoline and will emit no pollutants, only friendly H20.

All that sounds wonderful, but I worry that executives at GM might actually believe this public relations copy. What is wrong with the story that GM is telling in its annual report and in national advertising?

Let us start with the bragging about all those GM vehicles that get 30 miles per gallon on the highway. Most of GMâ€™s customers buy trucks, and those trucks do not get anywhere near that mileage. The actual mileage for those vehicles is closer to 16 mpg. For passenger cars, I figure that GM holds around 16% of the U.S. retail market, excluding rental fleets, so there are not that many buyers for GMâ€™s fuel-stingy cars. One of GMâ€™s best-selling economical cars is the Chevrolet Aveo, which GMâ€™s Daewoo affiliate builds in Korea. The Aveo does not help GM save U.S. jobs or factories.

Yes, GM is making a big push for E85 and flex-fuel vehicles. But you would be lucky if you could find one of the few E85 gas pumps somewhere in the Midwest, This wonâ€™t mean much until most of Americanâ€™s gasoline stations offer E85.

It is also true that GM sells some hybrid buses, but riding the bus is not the major transportation method in this country. Most of us drive to work, so the significance is small. As for that â€œhybridâ€ù pickup, it is not really a hybrid, saves little fuel and GM makes only a handful anyway.

OK, the coming hybrid Saturn Vue--due later this year--might attract some interest. But the gain is four miles per gallon, and I have my doubts about how much excitement that will cause. The crucial new hybrid system for GMâ€™s bigger trucks, such as the Chevy Tahoe SUV, is at least 18 months away. I expect a 25% mileage improvement with this technology, which on paper means 20 to 22 miles per gallon from combined city and highway driving on the four-wheel-drive models. I do not underestimate this new hybrid technology from GM and its partners, as it could be important in keeping big vehicles viable in this day of $3 and up gasoline. Even so, 21 mpg is not shock and awe.

General Motors does not seem to understand why Toyota Motorâ€™s (nyse: TM - news - people) Prius hybrid got everyone so excited. For starters, Prius is a distinct model--one that does not look like anything else on the road. Every Prius is a rolling billboard for Toyota and its hybrid technology. While every Prius customer may not get the stated mileage of 60/51 (city/highway) mpg, they should get somewhere in the mid-40s. Just imagine what we would think about GM if the Prius were a Chevrolet, and if GM had used the $1 billion it spent on its failed electric car, the EV-1, to develop a unique hybrid car.

Maybe GMâ€™s investment in fuel cell technology will pan out some day. Maybe someday. The company has made progress in improving the efficiency and reducing the cost of fuel cell vehicles, but it is still several orders of magnitude away from making this technology financially viable. In addition, the distribution infrastructure for hydrogen is a far bigger obstacle than retrofitting todayâ€™s service stations for E85.

Itâ€™s a shame that GM just doesnâ€™t seem to understand the power of showmanship. We all remember Babe Ruth, but who remembers the greatest hitter of bunt singles? A Chevrolet Tahoe that gets 21 miles per gallon is a fine technical achievement. So is a bunt single.

What should GM do to enhance its reputation in fuel economy? For starters, it should Take the Pledge: Every new car and truck will have better fuel economy that its predecessor.

The company should announce a goal to build a car with a conventional engine getting a real 50 miles to the gallon. Every year at the annual Detroit auto show, GM should have a show car demonstrating progress toward that goal.

GM should also embark on a high-priority program to offer diesel engines in all its big pickups and SUVs--effective as soon as the big oil companies get off their rumps and make low-sulfur and higher-quality diesel fuel available everywhere in the country. Speaking of the oil companies, GM should publicly pressure them to make ethanol-based fuels widely available at

U.S. service stations.

Finally, I think GM should rise to the challenge of the Toyota Prius and make its own unique hybrid--something special, akin to the BMW Mini. If done right, the company could keep a factory busy making this vehicle, and get top dollar for it, too.

Jerry Flint, a former Forbes senior editor, has covered the automobile industry since 1958. Visit his homepage at www.forbes.com/flint

APPENDIX O

Scuderi Unveils Advanced Air-Hybrid Engine Concept

By Mike Sutton
WardsAuto.com, May 25, 2006 10:47 AM

DETROIT – The Scuderi Group, proprietors of advanced engine technology and developers of the Scuderi split-cycle engine, takes the wraps off its new Air-Hybrid split-cycle powerplant here at a recent industry conference here.

Touted as the "first hybrid system that makes sense," the air hybrid concept uses the West Springfield, MA-based company's advanced engine design to compress and store excess engine intake air in much the same fashion a hybrid/electric vehicle (HEV) stores energy in batteries.

At the heart of the Air-Hybrid is Scuderi's patented split-cycle engine, a unique design concept dating back to 1914 that divides a 4-cycle internal combustion engine's individual strokes of operation into opposing cylinders – one side for intake and compression, the other for power and exhaust.

Connecting the cylinders is a pressurized crossover passage that transfers the compressed intake air from the compression cylinder to the power cylinder. Unique disc-type check valves, adapted from air-compressor design, control the airflow from the compression cylinder, allowing nearly all of the pressurized gas to be utilized before the next intake cycle begins.

Camshaft-driven poppet valves control airflow in and out of the power cylinder and prevent the combustion process from "backtracking" into the crossover chamber, the company says.

The hybrid element of the engine begins in this crossover chamber, where a separate valve controls the flow of excess air into an external storage tank. The tank is pressurized to a similar degree as the combustion chamber gases – about 735 psi (50 bar) – and has a volume of about 1L per each of the engine's cylinders, says company President Sal Scuderi.

Once the tank is charged, the air supply can be used in several ways.

In low-load situations, the compression cylinder can be disabled, allowing the power side of the engine to be fed with stored compressed air from the tank. The company says this greatly enhances efficiency by eliminating the power losses of the engine's compression cylinder.

Conversely, the power cylinder can be switched off during coasting and braking, thereby allowing the compression cylinder to act as a built-in engine brake. Regenerative braking also occurs, as the compression cylinder's intake air is routed into the storage tank to replenish any compressed air that has been depleted.

During regular cruising, the system also can vary the distribution of the intake air to both supply the power cylinder and fill the storage tank.

Split-cycle engine divides 4-stroke operation into separate cylinders.

An added benefit of the design, Scuderi says, is the on-board supply of compressed air itself. The charged air could be used to start the engine if the battery runs low, operate air brakes, inflate tires and operate air tools – features that would have considerable value for commercial trucking and military applications.

In addition, the compressed air could be used to power a pneumatic valve system for the power cylinder, enabling a completely camless design and further improving efficiency.

The company says adding the Air-Hybrid feature to the split-cycle engine requires only a “few hundred dollars” of additional investment, compared with thousands for typical hybrid-electric powertrains.

Currently, the split-cycle engine exists only in the computer modeling stage at the Southwest Research Institute (SwRI), a San Antonio-based nonprofit engineering lab that is working with Scuderi on thermodynamic development of the engine.

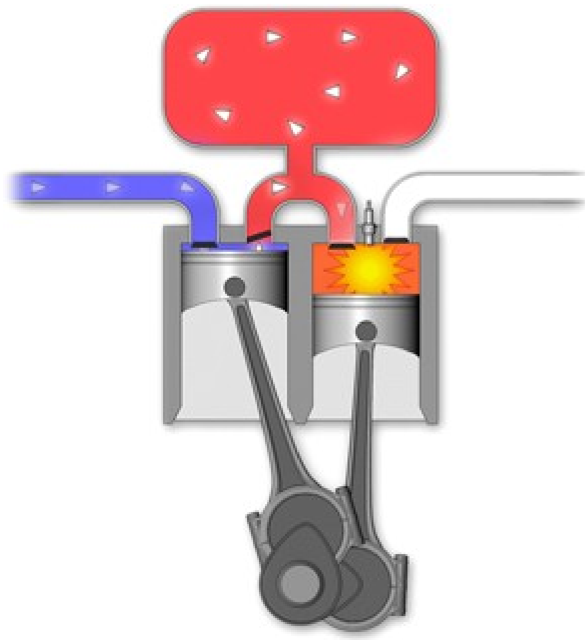
The program has been funded by about $8 million from various private investors, including a $1.2 million grant from the U.S. Dept. of Defense’s Appropriations Bill passed earlier this year.

Along with computer modeling and fluid-dynamics evaluations, Scuderi also has tasked SwRI with development of two working prototypes of the split-cycle engine, which it plans to unveil next year – a 2-cyl. gasoline-powered model and a 6-cyl. diesel variant.

The compatibility with various types of fuel, including gasoline, diesel, biofuels and natural gas, is just one of the many benefits the company touts.

Because of the split-cycle design’s similarities to conventional 4-stroke engines, the technology can be scaled to apply to any piston-driven engine, large or small.

The similarities to conventional internal-combustion engines also necessitate a minimal amount of retooling to manufacture the split-cycle unit, an aspect that dramatically improves the concept’s prospects for mainstream production applications, Scuderi says.



Air-Hybrid uses external tank to store excess engine intake air.

However, the real benefits of the engine concept, with or without the Air-Hybrid feature, may be the potential dramatic improvements in efficiency and emissions it makes over traditional IC engines.

Scuderi claims the split-cycle technology can produce significantly more power than a conventional engine of equal size; nearly double a vehicle’s fuel economy; improve the efficiency of current engines by 24%; and exceed the efficiency of modern HEVs without using a costly and complex electrical system.

The concept also emits about 80% less oxides of nitrogen (NOx), primarily due to its ability to ignite the intake charge after the piston has reached top dead center (ATDC), a unique feature that Scuderi says is key to the engine’s success.

Firing ATDC, along with the development of the check valves in the crossover passage, were the major hurdles the company had to overcome in making the split-cycle engine workable, the company says.

Due to the massive turbulence created by the pressurized air entering the combustion chamber from the crossover passage, the fuel/air charge vaporizes much faster than in a conventional engine, Scuderi explains. The faster fuel atomization also creates a much quicker combustion flame speed inside the chamber when ignited, making it easier to burn all the fuel in a shorter amount of time.

Even though firing ATDC means the piston is moving away from the charge when it is ignited, reducing the pressure inside the chamber and limiting its power potential, the greater flame speed is said to compensate.

In addition, because of the lower pressures and the more efficient burn, peak temperatures inside the combustion chamber are reduced, which is largely responsible for the large NOx reduction, Scuderi says.

The inherent design of the split-cycle engine – with different components handling individual parts of the engine cycle – also allows for mechanical advantages that would be impossible to obtain in a conventional engine.

By making the compression cylinder larger than the power cylinder, a natural supercharging effect is generated as the greater volume of air on the compression side is crammed into the smaller space of the power cylinder. The pistons also can be offset in relation to the centerline of the crankshaft in order to reduce the internal friction of the engine's components – a design seen in some contemporary production engines.

These intrinsic features, along with the benefits of the Air-Hybrid system, play an even greater role in diesel engine applications, as they reduce reliance on turbocharger, fuel injection and exhaust aftertreatment systems.

The split-cycle's built-in supercharging effect eliminates the need for a turbocharger, Scuderi developers say, while the reduced engine-out NOx emissions allows for the use of less complex and expensive aftertreatment systems, Scuderi says.

Because the engine fires on only half of its cylinders, half as many fuel injectors are needed to produce an equivalent amount of power. Furthermore, the turbulent, high-pressure gas entering from the crossover passage means that less-expensive, lower-pressure injectors can be used with no degradation in performance.

The Scuderi Group currently has six patents filed in 45 countries for the split-cycle engine, with several more recently filed and pending.

Although he declines to specify potential customers and partners due to the engine's early stage of development, Scuderi says the concept has been well received, with several auto makers showing interest in the technology.

However, the company has no plans to become an engine manufacturer. Once development is complete and the prototypes prove viable for mainstream production, Scuderi plans to license the design to various companies.

"These technology enhancements, and the subsequent patents, come at an important time as we as a nation look to be more efficient in our use of petroleum products and while the automobile industry struggles to increase the value of their vehicles," Scuderi says.

"Once these advancements are incorporated into our internal combustion engine, the industry will have available the fuel efficiency, power, and impact on the environment that consumers are looking for and at a cost that makes sense."

APPENDIX P

Saab Sales and Image Taking Off: Young Buyers Pick It over BMW and Mercedes --- Auto123.Com
By Alex Law, May 2006

In the normal course of a story like this, I would blow corporate bumph and middle-aged opinion and sales results about Saab up your skirt until you couldn't see for blushing.

But you're in luck today, since there's a survey about the used car desires of Americans between the ages of 18 and 24 to tell you about instead, and it's more compelling than the normal smoke.

In this survey conducted by an extremely reputable firm (CNW), 1.28 percent of the respondents currently looking for a used car would consider "any Saab" as a possible purchase. Now, this number won't seem like much until you consider that the vehicle with the highest rating, the Jeep Wrangler, only scored 16.92 percent.

What's more telling about the results of this survey is that no BMW or Mercedes models appealed to enough of these young people (1 percent was the minimum level needed) to make the list.

If I can twist an old expression just slightly, being picked ahead of those two German premium brands by young people tends to give Saab a kind of canary in the cool mine status that's hard to ignore. Believe me when I tell you that these survey results will give marketing executives at BMW and Mercedes pause.

The results do not surprise me, however, since BMW and Mercedes customers have a tendency to be, respectively, pretentious or stodgy, and probably even parental. If you're a kid who wants to spray a little Eau de Voyage de Mer on his or her personality in your next automobile, you probably don't want something that your father the tax accountant or your mother the successful real estate agent drive.

If this all sounds pretty superficial, well, that's because decisions between one kind of premium product and another usually are, and they are forever ephemeral. Many of the folks buying Beemers and Mercs today do so because their parents bought Caddys and Lincolns, and it's unwise to think the same kind of brand rejection won't happen with their children.

There's little real fundamental difference between cars of similar size and equipment that cost this much, so image and impression tend to take on extra significance. Sure, differences may show on roads where it's legal or even possible to go 250 kmh, but with the legal and traffic realities of North America they count for naught.

In the road reality of Canada and the U.S., then, the lineup for the GM-owned Saab brand is pretty solid. There's the entry-level 9-2X they borrowed from the Subaru which hasn't been very successful and might be replaced one day by something from GM's European lineup. It's still an excellent choice for someone looking for a sporty compact car.

There's also the new Saab 9-7X, which is an American SUV with the kind of accent the Swedish chef had in The Muppet Show. It's still an excellent SUV and the Saab-esque touches make it different, and that can appeal to lots of folks regardless of their age.

The core models for Saab continue to be the 9-3 and recently upgraded 9-5, which offer turbocharged iterations of the sedans and wagons themes, offering comfort and performance for more reasonable operating costs than is traditional in this segment.

But if there was a lodestar for the entire brand it would be the convertible version of the smaller 9-3 line. There's just something about the 9-3 droptop that makes it special.

I can tell you from vast experience that it is THE single best car on the road for touring someplace beautiful and/or cool. Being in a Saab convertible has raised the enjoyment level for visits to San Francisco, St. Petersburg, the northern most point of Europe, the Pacific Coast Highway, New England, and the Riviera several times. It can also do wonders toward making your home town more appealing.

The Saab 9-3 ragtop works better than competitive models from BMW, Mercedes and Volvo because it doesn't have the heavy emotional baggage of those brands, and that helps you chill out and relax, dude, which is the primary directive of a convertible.

By far the biggest noise for Saab right now can only be heard in Sweden, where the BioPower version of the 9-5 is at the top of the environmental cars list, outselling everything on the market, including the Toyota Prius hybrid by about five to one. GM has plans to extend the use of E85 (85 percent ethanol) models like this around the world, but at present Canada has only two (2) stations that provide this fuel, so we shouldn't hold our breath.

As for that futuristic Aero X concept car, we're not likely to see it on the road any time soon, but we should see elements of its design on future real-world Saabs.

In general, things are working out fairly well for the folks from Trollhattan, which, in case you were wondering, translates pretty much directly into English.

Saab sales are taking off around the world, going up 17 percent in the first quarter of 2006 versus 2005. In Canada, the increase is even greater -- 29 percent. And if there's anything to that survey charting the buying habits of North American youths, future growth levels could be even greater.

APPENDIX Q

Rise of The Neo-Greens

Solar panels on the roof. Hybrid car in the garage. Organic-cotton clothes in the closet. Today's eco-radicals are voting with their dollars.

- **Think of Howard Brown** as a Forrest Gump for the Gen X set. Wherever the zeitgeist has galloped in the last two decades, Brown has been a few strides ahead, waiting when it arrived. Back in the '80s, while living in Seattle, he followed a cool local band that he thought had promise. Its name: Nirvana. A few years later, in Philadelphia, he published a popular zine at the dawn of that now-forgotten pre-blog explosion of self-expression. Then he latched onto the extreme-sports craze and took a job working for Burton Snowboards, moments before the X Games went big time. In the late '90s - of course - he became a dotcom dreamer and headed to California, only to awaken with a drawerful of worthless stock options.

So where is this one-man cultural GPS now? Sitting in a third-floor Manhattan showroom, surrounded by racks of fall fashion, making the case that he's onto the newest new thing once again: clothing and accessories that combine high style with environmental awareness. "It's a revolution," he announces.

Brown, 38, is half of the fashion house Stewart + Brown. His partner in business and life is Karen Stewart, a 36-year-old former painting student who started out designing clothes for Urban Outfitters and J.Crew. Now the two of them are making T-shirts, sweaters, and other sportswear from organic cotton - and selling them not at the local food co-op but at ritzy boutiques in the US and Japan. The couple and the company embody a new approach to commerce, one that refuses to sacrifice style for sustainability. Call it the green aesthetic. Tearing a page from the playbook of centrist politicians like Bill Clinton and Tony Blair, the green aesthetes are charting a third way, triangulating between the hippies and the hip. They've detected the first stirrings of a new constituency in the marketplace: Prius-driving, solar panel-installing, Sierra Club-donating, look-at-me environmentalists.

Who are these emerging tribes of neo-green consumers, and what makes them tick? Experts in consumer behavior have peered through the windows of hybrid cars for clues.

The first wave of hybrid buyers share two notable demographic features: "affluence and suburbia," says market researcher Tom Spencer. People who drive hybrids tend to be fifty- to sixtysomething suburbanites with grown children, says Spencer, a VP at Claritas. Wealthy suburb-dwellers, who comprise about 5 percent of US households, bought 11.5 percent of all new cars in 2004. But they bought 17.5 percent of all new Priuses, according to Spencer, who crunched the numbers for Toyota and Honda. J.D. Power and Associates found in 2003 that while the average household income of all new car buyers was $85,000, the average household income of hybrid purchasers was $110,000.

Of course, people of all stripes drive hybrids. But regardless of age or income, consumers buy cars with gas-electric engines primarily because of what the vehicles say about them - to themselves and to everyone else. That's what Ken Kurani and his colleagues at UC Davis learned when they studied Prius, Civic, and Insight drivers in 2004 and 2005. "We had a hard time explaining why people bought hybrids," Kurani says. If consumers calculated the cost of the car and how much gas money a newfangled engine would save, the numbers wouldn't add up. But few actually did the math - and those who did didn't care. "We have yet to find anyone for whom saving money was the most important factor."

Instead, as Kurani (an engineer) and his partners (an anthropologist and a PhD student) interviewed hybrid owners, they discovered that the cars were "symbols of identity." Buying a Prius or Honda Civic hybrid was less about careful economic reasoning than about self-expression and self-understanding. "People construct their identities as a narrative. The project of our lives is to tell a more interesting story about ourselves," says Kurani. "In large part that's what we see happening with hybrids."

For most buyers, the goal wasn't fuel economy. It was to produce fewer emissions, to minimize external harm - and to let everyone else know that they've made a deliberate choice to do so. "Lower resource consumption is part of an identity people are constructing. They want to be seen as someone who's concerned about the world around them," Kurani says. At the same time, "they want others to see that they've done this, so that others might see themselves doing this."

Researchers have found similar motivations for the early adopters of that other staple of the neo-green movement, solar power. Until recently, installing solar panels didn't make financial sense. The cost of photovoltaics often exceeded the savings they'd bring to an electric bill. But some consumers, especially affluent households in the West, went solar anyway, motivated by an interest in sustainability and the desire to make a statement from their rooftops. Then economies of scale kicked in, changing the cost-benefit dynamic. Now, according to a March survey by Environment California, solar power "enthusiasts" are four times as likely to be motivated by saving money as by protecting the environment. "As the price of solar has come down, the economics of making that statement match up to the price point of more people," says Arno Harris of the solar provider EI Solutions.

Hybrids will likely follow the same development curve. But until the technology becomes cost-effective, consumers are content to use the Prius as a way of peacocking individual virtue and persuading fellow citizens to change their ways. "Cars are mobile billboards for all of us," Kurani says.

In fact, there's only one consumer item that's more self-expressive, more mobile, and more on display than the car in your driveway - the clothes on your back. Which is why green apparel - the logical extension of the hybrid movement - is on the rise. A $300 bamboo blouse seems expensive compared with what you'll find at the Gap, but neo-green consumers don't see it that way. See-me-environmentalists aren't looking for any old clothes; they want outfits to match (and reflect) their lifestyles the same way their cars do. As for would-be eco-radicals who can't afford to make a $25,000 statement - well, a cashmere sweater produced by a herders' co-op in northwestern Mongolia is a cheap way in, a sort of greenie gateway drug.

In February 2005, during the hoopla of Fashion Week in New York, a phalanx of models strolled down a catwalk wearing hemp/silk gowns, organic-wool dresses, and bustiers made from recycled polyester. FutureFashion, as the show was called, was something of a coming-out party for the green aesthetic movement.

Eco-chic is now sprawling across the cultural terrain. Bono and his wife, Ali Hewson, recently teamed with of-the-moment denim designer Rogan Gregory to create a clothing line called Edun (that's *nude* spelled backward). Edun produces fair-trade T-shirts, jeans, and organic-cotton sweatshirts sold at high-end department stores like Nordstrom and Saks. Gregory's been busy; he also colaunched Loomstate, which makes organic-cotton jeans that sell at Barney's for about $165. Meantime, clothing and accessories made out of obviously recycled materials - everything from newspapers and phone books to old inner tubes - are showing up on the runway and on the street. Upscale greentailers from Brooklyn's 3R Living to Green Loop outside Portland, Oregon, have sprouted like organic mushrooms after a sun shower to sell fashion and furniture to people with thick wallets and guilty consciences.

The surging popularity of organic material - fibers grown without pesticides or herbicides - demonstrates that the neo-greens want to know the source of what they buy. They associate organics with not just healthy eating but low-impact, earth-friendly, sustainable farming. For a generation of shoppers, the certified-organic label has become a Garanimals tag for grown-ups. According to the Organic Trade Association, sales of organic clothing were projected to reach $88 million in 2004 - up 30 percent in two years.

Web sites have begun popping up to help consumers appear fashionable and still be environmentally defensible. Every month, more than 430,000 people visit Treehugger.com, which caters to "design-obsessed undercover bleeding hearts." Launched in July 2004, this site is produced by a far-flung group of bloggers on four continents who earn $10 to $15 per post. Now the tastemaker of the green aesthetic, Treehugger postings help readers price-check sorghum ottomans or find that perfect pair of recycled tire-valve earrings. "We're trying to make it easy by aggregating the sexy green stuff," says Graham Hill, the affable 35-year-old Canadian who founded the site. Ventures like these, as well as self-described "organic pioneers" like Stewart + Brown, are finding opportunity by pushing back against both the high-style chic crowd and the high-doom environmentalists.

To the fashionistas, the neo-greens say: Fashion is a dirty business; wake up and see the consequences of what you're doing. Stewart's awakening occurred when she was working for Patagonia, one of the first clothiers to move to organic cotton. For a decade, she had been designing countless cotton garments without thinking about the source of the fiber. Then she toured a conventional cotton farm in central California. "It was so toxic we had to shower afterward to wash away the chemicals," she recalls with a wince. To grow the cotton needed to make one T-shirt, she learned, farmers use one-third of a pound of pesticide. The bug killer can contain cyanide, dicofol, naled, propargite, trifluralin, and other carcinogens, traces of which can seep into the soil, infiltrate the cotton seeds, and cascade into the food supply. "Cotton is marketed as this pure white American commodity," says Scott Hahn, a cofounder of Loomstate. "That's deceiving."

But green aesthetes aren't just about blaming the runway set. They're also taking aim at what Brown calls "hippie conservatism," the hand-wringing gloom and doom that equates virtue with a conspicuous lack of style. Brown and his peers are willing to utter the unspeakable truth: Hemp ponchos and vegan sandals are butt-ugly, and most people who wear them look ridiculous. For a twentysomething on Friday night, a nubby brown sackcloth just doesn't cut it. "The hippies have been the backbone of the alt-environmental movement," Hill says. "But aesthetics matter. We're trying to show that you can be cool and hip and still give a fuck about the environment." The green aesthetes take their ideology bright, not dark. "We try to be super-optimistic," Hill says. "We're pro-business, pro-solution. The space we're trying to fill is motivation by hope, not fear."

But one groovy mom-and-pop business does not a revolution make. Stewart + Brown's sales are on pace to more than double to $2 million this year, but that's hardly a fortune in the low-margin rag trade. Organic-jeans maker Loomstate is growing, but it sells less in a year than Levi Strauss sells in a day. And while Treehugger is popular, it gets a sliver of the traffic of Amazon.com or even Boing Boing. The green aesthetic may be a movement, Hill says, but many advertisers still don't see the green aesthetes as a market. What's needed to nudge them fully into the mainstream is not just clever triangulation but an entire infrastructure - efficient supply chains, improved technology, and power retailers.

It's Wednesday night at the edge of West Hollywood. While the ultrachic are preparing for post-Grammy Awards party-hopping, the semi-chic are here at an annex to a grocery store, fingering organic towels.

Back in October, Whole Foods Market opened its first Lifestyle shop a few doors from the bustling supermarket it operates on Santa Monica Boulevard. The business logic was simple: Consumers who are concerned about what they put *in* their bodies are also concerned about what they put *on* their bodies. So the retailer set up shop to sell organic-cotton underwear and recycled-plastic pants, mostly among its groceries, but also in annexes like this one. If anyone can take the green aesthetic to the masses, it's the country's fastest-growing grocery chain.

I walk along the bamboo flooring past the pots of sustainable grasses and a mannequin sitting in a Sukhasana yoga pose atop a bed made of sustainably farmed maple, and head toward the Stewart + Brown section. They're offering a $160 shirt jacket, a $60 bay leaf-colored T-shirt with an artichoke print, and a $160 wrap hoodie - all made from organic cotton. Loomstate is here, too - selling a $55 ecru T-shirt emblazoned with EXTINCTION IS FOREVER. There's a line of Green Babies clothing, which helps planet-conscious yoga moms stuff their offspring into organic onesies. What's more, like any nice clothing shop, even one whose walls are coated with low-VOC paint, Lifestyle features all manner of accessories - seat belts repurposed as men's belts, bicycle chains turned into $9 bracelets - as well as housewares and furniture.

It's easy to scoff at the venture. Would someone shopping for organic rutabagas also, on impulse, toss an eco-thermal henley into the cart? Would she really walk the aisles of a grocery store searching for hemp bedsheets? During my two visits to the West Hollywood outpost this winter, the cash register scarcely rang. The company won't release sales figures for its Lifestyle arm, but Whole Foods isn't generally a company to bet against. It entered about the most brutal, competitive, thankless business around - where the margins are thinner than the shaved ham in the deli case - and proceeded to reinvent retail grocery and attain a market cap of more than $8 billion. All this on the back of a simple idea: People will pay more for free-range chicken and organic strawberries. Apparel is the next step. As company official Marci Frumkin says, "One day, you will find Lifestyle stores everywhere."

That may be corporate bravado, but there's plenty of it to go around in this fast-growing business. Loomstate's Hahn says, "Eventually you're going to see Target and Wal-Mart all over this." Because while it remains to be seen whether the green aesthetic will become as mainstream as, say, a double soy latte or even a Toyota Prius, it does have two powerful forces working in its favor: supply and demand.

Start with supply. Early adopters like Stewart + Brown and Loomstate, as well as more established players like Patagonia, Nike, and Timberland, are locking in long-term contracts with organic growers and bringing new farmers into the fold. That ensures a steadier stream of production, which will make prices more predictable and will kick-start some economies of scale. Over time, increased demand and decreased production costs will lure additional players, which helps create still greater efficiencies, boosting output and lowering costs.

But the neo-greens also recognize that the supply chain is not only a partner of demand - it's a part of demand. The people who buy heirloom tomatoes at Whole Foods, like the consumers who wear Stewart + Brown sweaters, aren't just buying a product. They're buying a story - the tale of where the product came from, how it was made, and who had a hand in producing it. Those stories become part of a personal narrative, a way to signal individual virtue and spark collective action - like a Prius. In a world awash in choice yet wary of race-to-the-bottom-line capitalism, more shoppers will pay a premium to know the source of ingredients and the practices in the supply chain. Yet a funny thing happens when consumers pay a little more for something: Producers rush in to give it to them. Which shrinks the premium and eventually makes the product widely attainable. After all, even Wal-Mart now sells organic food.

The green aesthetic entrepreneurs have grokked this lesson. They know that there's a force larger than either the World Wildlife Fund or *Women's Wear Daily*: an army of citizen shoppers with some extra cash. As Treehugger's Hill puts it, "Unless you're doing the loincloth thing, you need stuff. So you might as well vote with your dollars and buy the right stuff."

Merchants of the world, to arms. A brigade of stylish, eco-aware customers is massing at the gates. And they're ready to spend.

Contributing editor Daniel H. Pink (www.danpink.com) *wrote about* New York Times *columnist* *Thomas Friedman* *in issue 13.05.*

APPENDIX R

Now in the Rearview Mirror: Low Gasoline Prices

By JAD MOUAWAD
Published: April 8, 2006
http://www.nytimes.com/2006/04/08/business/08gasoline.html?pagewanted=all

Drivers are once again feeling pain at the pump. Prices have soared in recent weeks, reaching a national average of $2.61 a gallon for regular gasoline, 36 cents more than at this time last year, according to AAA. In California, drivers have paid $3 a gallon and more.

Unsurprisingly, the volatility of crude oil, which has doubled in price over the last two years, is the primary driver of gasoline prices. Oil accounts for about 60 percent of the price of gasoline — the rest is broken ddown among taxes, 20 percent, and then refining and marketing costs, which remain fairly constant. Yesterday, oil futures in New York traded at $67.39 a barrel.

After Hurricane Katrina, gasoline prices briefly increased above an average $3 a gallon nationally when refineries along the Gulf Coast were shut down. That brought prices, once adjusted for inflation, above records reached during the oil shocks of the late 1970's and early 1980's. There were even short-lived gasoline lines as supplies failed to reach consumers.

To be sure, producers are starting to make the huge investments that will eventually increase the world's production, but that process will take years to complete.

Meanwhile, there is very little extra oil to put on the market to damp prices.

With such a tenuous — and unstable — system, there is not mu much margin for error, said Jan Stuart, an economist at UBS in New York.

Still, the biggest surprise so far is that high prices seem to have had little impact on driving habits. Gasoline demand, which averaged 9.1 million barrels a day last month, remains very strong; in fact, it is up by 2 percent since January 2004 when oil prices began to rise. Analysts are puzzled.

"The real question is, What will consumers do?" said John Felmy, the chief economist at the American Petroleum Institute, the industry's main trade group. "That's a key part of the equation."

In Washington, the prospect of high energy prices during an election year has spurred Congress into action. On Thursday, the Senate Judiciary Committee introduced a bill aimed at increasing competition in the oil and gas industry and strengthening antitrust regulations.

While demand remains robust, there have also been mounting concerns about gasoline supplies, especially this summer.

Indeed, refiners have been hard pressed to catch up with rising demand. While refining capacity has increased in recent years, it has been outpaced by the growth in consumption. The domestic capacity is around 17 million barrels of oil a day, but the country consumes some 20.5 million barrels of oil products a day, nearly half of that as gasoline.

To make up the difference, the nation has grown increasingly dependent on imports of a wide range of petroleum products, chief among them gasoline. For example, gasoline imports reached one million barrels a day last year, or nearly 11 percent of the country's daily needs.

Faced with strong public and political pressure, refiners announced in recent months plans to increase the country's total capacity by about 1.4 million barrels by 2010, according to Bob Slaughter, the head of the refiners' trade group.

Still, he added, "In any scenario, the imports are going to continue going up."

The problem is that some imports from European or Caribbean refiners might not be available much longer as the United States tightens it environmental regulations.

Also, many analysts have voiced concerns about the industry's move to abandon a popular but highly controversial additive to gasoline, called methyl tertiary-butyl ether, or MTBE, and replace it with ethanol by May. The Energy Department issued a stark report in February that warned of a possible shortfall of 130,000 barrels a day, which ethanol producers might not be able to fill. The Senate also held hearings late last month to warn refiners about potential shortages this summer.

APPENDIX S

Is That a Tinge of Green on New York's Yellow Cabs?

By AUSTIN CONSIDINE
Published: May 21, 2006

Cleaner air, not saving money, was the original motivation for introducing hybrids to the city's taxi fleet. The Taxi and Limousine Commission, under pressure from the City Council, approved six hybrid models for taxi service last fall. The first batch entered the fleet in November; there are now 27 hybrid taxis on city streets.

While the environmental rewards of an all-green taxi fleet may be far off in the future, an independent driver who owns a hybrid cab would benefit each time the tank is filled. At 36 m.p.g., the E.P.A. rating of a front-wheel-drive Escape Hybrid doubles the mileage of a Crown Victoria cab; with each one covering 64,600 miles a year on average, and nearly 13,000 taxis in the city, total gas savings would amount to tens of thousands of gallons each day.

Evgeny Friedman's fleets, with about 650 cars in all, include 22 hybrid Escapes. The remainder of New York's hybrid taxis are two Lexus RX 400h's, two Toyota Highlanders and one Toyota Prius, according to the taxi commission.

Matthew W. Daus, chairman of the commission, cited the discounted price of taxi medallions for hybrids — auctioned in 2004 at about $170,000 lesss than the nearly $400,000 that medallions have sold for — as one inncentive for fleet owners to buy hybrids. [On Thursday, Mayor Michael R. Bloomberg announced that 254 of the 308 medallions to be auctioned next month would be designated for hybrid and alternative-fuel cabs. The remaining 54 were for handicapped-accessible taxis. Mr. Daus had opposed an earlier City Council bill that would have required half the medallions to be set aside for such vehicles. A decision had not been made on whether the commission would offer another discount on hybrids, he said.] Mr. Daus also mentioned a one-time federal tax credit —$650 to $3,150, depending on the model âà€” for increasing interest in hybrid taxis.

Drivers seem happy with the performance of the Escapes. Mr. Islam said that acceleration was not a problem and that the Escape's driver's seat was more comfortable than the Crown Victoria's. The biggest adjustment was the feel of the brake pedal, which activates the regenerative charging system to replenish the battery each time the cab slows down. In addition, the engine shuts itself off at stoplights to help save fuel.

Among the few customer complaints, Mr. Islam said, is the Escape's step-in height, which makes it difficult for some passengers to board. Another is legroom in the back seat, which is less spacious. Otherwise, Mr. Islam said, passengers love it. "The first time they ride in a hybrid, they ask a lot of questions. How's the hybrid? How's the gas?" he said.

Mr. Daus of the taxi commission said he hoped the hybrid was the first step in the evolution of alternative-fuel taxis.

"With hybrids and other alternative fuels there's going to be survival of the fittest," he said. "No. 1, who's going to give you the best fuel efficiency for your bottom dollar? And No. 2, how is your vehicle going to perform 24 hours, 7 days a week as a cab on the streets of New York City?"

APPENDIX T

No Silver Bullet for Gas Prices, Bush Aide Says

"This is a very large problem," Josh Bolten said on "Fox News Sunday" in his first interview since taking over April 14 as Bush's top aide. "It's built up over many years -- decades, in fact. It's not going to be solved in the short run by some silver bullet."

Administration officials, on the Sunday talk shows, drove home the importance of reducing U.S. consumption of foreign oil. Secretary of State Condoleezza Rice called it a "trap" and Energy Secretary Samuel Bodman acknowledged that rising gas prices had become a crisis. But he suggested that finding short-term fixes to soothe consumers angered by pump prices topping $3 per gallon might be difficult.

"We need to deal with the long-term problems of technologies that may get us out of this trap," Rice said on ABC's "This Week." "But I can tell you that if anything has surprised me as secretary of state, it is the degree to which the kind of search for hydrocarbons is distorting international politics. That means that the quicker we get about the business of reducing our reliance on oil, the better we're going to be."

Bush said last week that he wants Congress to give him the power to raise fuel efficiency standards for cars. The fleet average of 27.5 miles per gallon has not changed for two decades.

Red Cavaney, president of the American Petroleum Institute, defended his industry's profits, saying U.S. companies have consolidated over the years to compete with the growing size of foreign oil companies. U.S. oil company profits "typically come close to industry average," he said.

He also said the unrest in Iraq has exacerbated the situation by disrupting oil production.

"As soon as you can stabilize the civil situation, they'll significantly be able to ramp up production. But it would take years," Cavaney said.

Another oil industry lobbyist, former Sen. Bennett Johnston of Louisiana, said "saber rattling" on Iran is contributing to the high cost of crude oil. "We'd see gasoline prices above $5 or $6; crude oil above $100 if we bomb Iran," he said on ABC's "This Week."

Sen. Lisa Murkowski, R-Alaska, said on CBS' "Face the Nation" that the U.S. must start looking at increasing domestic supply such as "sensible drilling." Rolling back gas taxes or handing out $100 rebates, as Senate Majority Leader Bill Frist has proposed, might soothe consumers this summer but not in the long run, she said.

But Sen. Maria Cantwell, D-Wash., said the U.S. cannot assume it can "drill our way out" but should renew efforts on boosting competition and creating an alternative fuel market. "We need a strong law in place to protect consumers today."

APPENDIX U

No Silver Bullet for Clean Cars, Expert Says

SAE speaker says multiple powerplants possible.
by Paul A. Eisenstein (2006-04-04)
http://www.thecarconnection.com/Auto_News/Auto_News/No_Silver_Bullet_for_Clean_Cars_Expert_Says.S175.A10236.html

The group generally agreed that in North America, gasoline technology will remain dominant, at least into the 2020 range, though what will be under the hood by then may have only the most basic systems in common with today's engines, said Klaus Borgmann, director of powertrain development at BMW.

A variety of new systems will help deliver dramatically improved performance and fuel economy out of the gasoline engine. The latest variable-valve timing systems alone are increasing mileage by ten percent or more, and lean-burn engines, which BMW hopes to soon launch in Europe, could add another ten percent or better. Eventually manufacturers will have to focus on "energy management," Borgmann said, "dealing with all kinds of energy onboard the car." BMW, he noted, is even looking for ways to convert the heat of the exhaust into electrical or mechanical energy.

The hybrid is fast becoming the most popular way to address the issue of energy management, at least where the media is concerned. The panelists, however, cautioned that the added costs and other issues involved in hybrid technology may prevent it from going fully mainstream. Even Toyota's Dave Hermance told the audience that a 25-percent share for hybrids could be optimistic. Another question raised was what type of hybrids would dominate? There are micro-hybrids, which can only capture and re-use minimal amount of waste energy; mild hybrids, like the Honda Insight, which cannot run on electric power alone; and full hybrids, such as the Toyota Prius.

While mileage claims for hybrids have come under question, there's increasing recognition of the diesel's efficiency, noted Chris Cowland, technical director at AVL Powertrain Engineering. Improvements in diesel technology have been reinforced by Audi's recent victory at the 12-hour endurance race at Sebring, with the diesel-powered R10 racecar. Diesels now outsell gasoline cars in Europe. But John Moulton, president of Robert Bosch Corp.'s powertrain division, emphasized that before diesels can gain traction in the U.S., makers need to solve some nagging problems. New emissions standards for oxides of nitrogen and particulates are still troubling, and the solutions under development are costly. Even so, the panelists generally expected to see diesels account for as much as a quarter of the U.S. market within the next 15 to 20 years.

But don't rule out the gasoline engine, the panelists agreed. Some even more dramatic approaches could make it nearly, perhaps even as, efficient as the diesel, various members noted, with technology such as turbocharging and direct injection. Honda Senior Manager Yasuyuki Sando pointed to the automaker's experimental HCCI engine, which operates much like a diesel but runs on gasoline. In other words, it uses compression rather than a spark to ignite the air/fuel mixture. "It has the potential to achieve even lower CO_2 emissions than the diesel," said Sando.

The one thing that everyone agreed on is that the pace of work on alternate power is ramping up. No surprise, said EPA's Alson, for "The price of oil changes everything." And with the cost of a barrel of petroleum expected to continue rising, the momentum for change is growing. What it's likely to yield is a mix of different powertrains that will allow buyers to find the solution best suited to their own needs and budgets.

APPENDIX V

Tuesday, May 30, 2006
Fill 'er up with moonshine
Stills offer homemade answer to energy woes
By Bill Poovey
Associated Press

An upstart Tennessee business is marketing stills that can be set up as private distilleries making ethanol -- 190 proof grain alcohol -- out of fermented starchy crops such as corn, apples or sugar cane. The company claims the still's output can reduce fuel costs by nearly a third from the pump price of gasoline.

Buyers of stills need a federal permit to make ethanol. The government also says permit-holders must add a poison to their homemade alcohol so that it cannot be consumed.

"We make it very clear that it is against the law to drink what comes out of it," said Shelley McClanahan, a spokeswoman for her family's business, Dogwood Energy.

The company is building four or five stills a day and has sold 45 in recent weeks -- and more than 125 since September. Customers range from small businesses to thrifty individuals.

A bushel of the fermented starch crop, mixed with yeast, water and sugar, and allowed to sit for about 2 1/2 days, then strained and heated to boiling, makes about 2.6 gallons of ethanol, which is then added to gasoline to produce a blended fuel.

Sasher's stills, which stand about 6 feet tall and easily fit in an airy garage corner, sell for about $1,400 each. Blueprints are about $45 and buyers who are good salvagers can build a still themselves for less than $1,000, McClanahan said.

The Dogwood Energy still is one that Sasher, 57, developed by modifying designs that date to the 1970s gas shortages.

Its great advantage is cooking the mash at just the right temperature, 170 degrees, according to John Franklin, a former engine company design engineer and educator in Evansville, Ind., who has ordered two of the stills.

McClanahan said no customers have reported accidents with the stills.

Matt Hartwig, a spokesman for the Renewable Fuels Association, which represents ethanol producers, has heard of Dogwood Energy.

"You've got to appreciate Americans' entrepreneurial spirit," he said.

He hasn't heard of anyone making homemade ethanol, though.

"The only ethanol I know being made at home is still the beverage," Hartwig said.

APPENDIX W

How Many Miles to the Bushel?

By PAUL B. BROWN
Published: May 27, 2006
http://www.nytimes.com/2006/05

It was not exactly an apples-to-apples comparison. Because there was not one automobile that could handle all types of fuel, the magazine tried to match the cars as closely as possible in size and weight. And the price it used for gasoline — $2.34 a gallon — is about 20 percent less than most people are now paying at the puump.

Still, the results in the cover article by Mike Allen are intriguing and surprising. The cheapest fuel was electricity. About one ton of coal would be needed to produce the requisite energy. Cost to drive coast to coast: $60. Using compressed natural gas would set a driver back $110. And biodiesel, made of used vegetable oil in the magazine's example, would cost $231.

Gasoline, as it turns out, figured in the middle of the pack. It would take 4.5 barrels of crude oil to produce the 91 gallons of gasoline necessary to get a Honda Civic coast to coast. The cost would be $213.

On the high end were E85/ethanol, a mixture of 85 percent ethanol and 15 percent gasoline, at $425, and M85/methanol, 85 percent methanol and 15 percent gasoline, at $619. And then there was hydrogen. It would require 16,000 cubic feet of hydrogen to power General Motors' Hy-wire concept car: $804.

Obviously, as the price of gasoline climbs, alternative fuels look more appealing. But Wired argues that even if we wanted to convert completely to bio-based fuels for our cars, we would have a problem. According to the magazine:

* One acre of soybeans can produce 50 gallons of biodiesel fuel.
* There are 427 million arable acres in the United States.
* The average American driver uses 464 gallons of gasoline a year and there are 198 million drivers in the United States.

All of which means:
"Arable acres needed to make enough biodiesel: 1.8 billion."

APPENDIX X

Interview with Tom McGee, President and CEO, I-CAR

Background: McGee holds a degree in Automotive Body Repair from Ferris State University in Big Rapids, Michigan. Joining I-CAR as a technical writer in 1990, Tom has steadily advanced to positions of Technical Supervisor, Tech Centre Manager and his previous position as Technical Director. Prior to joining I-CAR, Tom was training manager for an automotive education center, an auto collision repair instructor, and a collision repair technician, all in or around the Detroit, Michigan area. He began his association with I-CAR as a volunteer, moving into instructing I-CAR programs in the Detroit area.

About I-CAR: The Inter-Industry Conference on Auto Collision Repair (I-CAR) is a not-for-profit, automotive collision repair training organization whose mission is to research, develop, and deliver quality technical educational programs related to collision repair; to raise the level of available knowledge and recognize professional achievement; and to thereby improve communication throughout the collision repair, insurance, and related industries for the ultimate benefit of the consumer. I-CAR conducts training throughout the United States, Canada, and New Zealand. I-CAR has also been receiving additional requests for training worldwide, including Australia, China, and South Africa.

Ted: What do you think the big story will be this year for I-CAR and for the collision industry in general?

McGee: Improved ability to deliver training across North America and worldwide, and the continuing saga of new technology in automotive design and repair. We recently converted some 200 I-CAR instructors to full or part-time employees. It was a big change for us but the instructors have really stepped up to the plate and are delivering more training than ever before.

We have had tremendous support from the entire industry during this change and expect more good things to come. I-CAR has developed very strong relationships with the OEMs to deliver up-to-date, meaningful training and information to the collision industry. I-CAR training is currently recognized by Toyota, Ford, DaimlerChrysler and Volvo. We develop and deliver training for Audi and Jaguar at our Tech Centre in Appleton, Wisconsin. We also develop and deliver training for General Motors to the entire inter-industry through our own training network. I-CAR Training initiatives in New Zealand have been extremely successful and we are launching in Australia as we speak.

Ted: Please tell our readers a bit about the tools that I-CAR offers.

McGee: Training, training, training, training and recognition; live training, online training, virtual classroom training and satellite training. I-CAR also offers tests to prove and improve welding skills in aluminum, steel and structural applications. I-CAR has offered live, in-classroom training since we were formed in 1979. Since that time we have made vast improvements in our program content and expanded our delivery methods. Today, we offer operation-specific and system-specific training online, 24/7, anywhere in the world. I-CAR also offers a Virtual Classroom experience that brings live, interactive training to your door (or should I say your computer). We also broadcast training programs in Canada via CollisionTV and may expand that offering to the US. It takes technology to teach technology!

APPENDIX Y

Hyundai Delays Hybrid Car Sale
By Kim Yon-se
Staff Reporter
kys@koreatimes.co.kr 05-18-2006 18:18

Hyundai Motor and Kia Motors have decided to delay the commercialization of hybrid cars powered by electricity and gasoline by more than 12 months than earlier scheduled.

The countryâ€™s two major automakers originally planned to start massive production of the cars in late 2007, but Thursday said the eco-friendly cars _ the Verna and the Pride _ will be available from 2009.

Hyundai Motor said the delay reflects skepticism about commercial viability and possible violation of international laws.

Commenting on promised government aid, he said: ``Global competitors may file complaints with the World Trade Organization (WTO) against us if we lower consumer prices of the cars after receiving state funds.â€™â€™

It costs more to manufacture hybrid than gasoline cars. Expensive hand-making processes involved in producing hybrids are factors precluding a price reductions.

The high prices also reflect higher research and development costs. For carmakers, there is no choice but to bear the burden of losses by lowering prices if they want mass sales of the hybrid cars.

A Kia official said, ``We planned to sell to consumers from late 2007 after mass sales to ministries by late 2006. But we have to delay the schedule,â€™â€™ adding that its revised plan is the same as its Hyundai affiliate.

Policymakers are expressing anxiety over the future of Koreaâ€™s automobile industry as developed nations hurry to unveil as many hybrids as possible, amid growing regulations to protect the environment.

In an earlier interview with The Korea Times, Commerce-Industry-Energy Minister Chung Sye-kyun said, ``Hyundai Motor has fallen behind Toyota Motor in the research and development of hybrid cars.â€™â€™

Chung said concerns are growing as Toyota has already applied for a number of patents for hybrid autos.

Japanese carmakers plan to market their world-class hybrid cars here, signaling a wake-up call for South Korean competitors who are in the early stage of commercializing their environmentally friendly models.

APPENDIX Z

Environmentalists have touted hydrogen as the panacea for world energy challenges for decades, and as is common with populist environmentalist causes, their focus on hydrogen has caused more harm than good.

Ed "Redwood" Ring [] |
POSTED: 05.25.06 @06:10

This isnâ€™t the first time thoughtful critics – inside and ouutside the environmentalist movement – have called visions of the hyddrogen future a hoax, but unfortunately the hydrogen zealots still arenâ€™t listening.

First of all, hydrogen isnâ€™t a primary fuel. It has to be produced from something else, either from electricity via electrolysis, or refined from fossil fuel, or distilled from biomass. In all these cases, using the source fuel directly would be far more efficient than converting this energy into hydrogen.

Obviously refining hydrogen from fossil fuel isnâ€™t going to solve any energy shortages. Distilling hydrogen from biomass is equally problematic; it has the same problems all biofuels have – there isnâ€™t ennough land or water on earth to yield anywhere near the quantities of energy necessary to replace petroleum (read Will Biodiesel Replace Crude Oil, for a chart showing the relationship between land consumption and biofuel production). Moreover, if you are going to refine hydrogen from biofuel crops that truly make economic sense to grow, such as sugar cane, why not just burn the ethanol directly and save the energy losses from the conversion process?

Theoretically, electrolyzing hydrogen from renewable electricity and water is a way for hydrogen to make economic and ecological good sense. But this analysis neglects to consider where the electricity will come from, and more importantly, the significant conversion losses incurred when electricity is electrolysed into hydrogen. The hydrogen resulting from a process of electrolysis will have at best about 65% of the energy that was in the electricity used to make it.

If electrolysed hydrogen is then used to power a fuel cell automobile, the absurdity of its practicality becomes very clear. A fuel cell is necessary to turn the hydrogen back into electricity, and the electrical output of the fuel cell is at best only about 65% of the energy that was in the hydrogen used to make it. The compounding problem here – electricity from the ggrid made hydrogen via electrolysis at a 65% efficiency (best case), then hydrogen processed through a fuel cell made electricity at a 65% efficiency (best case) – means the electric motor providing traction for your fuell cell car will only be able to use about 40% of the electrical energy drawn from the grid for that purpose. Read The 100% Electric Car, for an in-depth explanation of conversion losses using fuel cell cars.

By contrast, a simple onboard battery can be charged and discharged at greater than 90% efficiency – a plug-in hybrid, available today, will usee grid electricity twice as efficiently as a fuel cell car. Furthermore, fuel cells cost $4,000 per kilowatt (a kilowatt is about 1.3 horsepower), they use expensive materials, they degrade quickly, they take several minutes to start, they canâ€™t tolerate cold, and vibration makes their membranes rupture. Meanwhile, batteries are cheap and getting cheaper. If youâ€™ve got cheap renewable electricity, there are better ways to exploit that electricity than by producing hydrogen.

Let’s not forget that nobody’s figured out how to store hydrogen. It is the lightest substance in the universe, so storing a meaningful amount of hydrogen requires pressurization up to 10,000 PSI. Even under these densities, the hydrogen equivalent of only a few gallons of gasoline could be carried on an automobile since otherwise the pressure vessel would weigh far too much. A natural gas vehicle, by contrast, requires the gas to be stored at only 300 PSI, a vast difference. The tanks, fittings and hoses to safely store usable amounts of pressurized hydrogen haven’t been invented yet. Maybe someday hydrogen can be stored via cryogenics, or in metal substrates using nanotechnology. Don’t hold your breath.

Will scientists figure out someday how to store hydrogen in practical, economical ways? Will they ever figure out how to build cheap, safe and durable fuel cells? The answer to these questions is yes, but probably not before they figure out how to develop ultra-capacitors or cheap batteries with extremely high energy densities.

The biggest problem with hydrogen is the opportunity cost of spending billions of dollars in research on this technology and lobbying for this technology when so many alternatives exist. Use more efficiently exploited feedstocks for hydrogen to power ultra-efficient clean diesel cars, serial hybrid cars, and battery powered cars. These technologies are here now, and they are being neglected. Hoax is not too strong a word to describe the environmentalist fixation on hydrogen, a technology that will be eclipsed by better solutions long before it ever becomes practical.

http://www.alwayson-network.com/comments.php?id=15059_0_11_0_C

APPENDIX AA

Hybrids: Frugal or Costly?
9 Considerations Before Buying
Bankrate.com

By Terry Jackson

When the first-generation Toyota Prius and the oddly styled, two-seat Honda Insight brought gasoline-electric hybrid engine technology to the United States, more than four years ago, skeptics wondered if this would be a quirky fad that would be popular among a few tree-huggers and then fade away.

After all, that's what happened with all-electric vehicles such as the General Motors EV1 that appeared in the late 1990s and failed to sell.

But the skeptics were wrong. Hybrids have taken hold and are expected to be a part of the automotive landscape for at least the next decade and likely beyond.

Witness the announcement by Toyota earlier this month that it will add 10 hybrid cars to its lineup and plans to sell 600,000 hybrids annually -- 25 percent of its total sales -- in the United States in the next decade.

This year, about 130,000 hybrid vehicles will be sold in the United States -- double the number sold last year and about 1 percent of all new cars that will be sold in 2005.

But even the impressive sales numbers have been overshadowed by the hype about hybrid vehicles, fueled by gasoline prices that threaten to rise to $3 a gallon.

So what's the truth about these new vehicles? Are they good buys? Are they as fuel-efficient as they seem? Will they help the environment? What about maintenance? What will happen when these vehicles start to get to 80,000 or 100,000 miles?

If you're considering a hybrid, here's a primer to help understand the issues and what you might be getting for your money.

What's available?
Right now, there are just 10 hybrid vehicles available in dealer showrooms: Ford's Escape sport utility vehicle; Mercury's Mariner SUV; Chevrolet's Silverado pickup; GMC's Sierra pickup; Honda's Insight, Civic and Accord; Toyota's Prius and Highlander SUV; and Lexus' RX 400h SUV. As many as 10 more will appear over the next few years.

On average, hybrids today cost $2,000 to $4,000 more than the same vehicle with a conventional gasoline engine, although the $49,000 Lexus RX 400h costs $11,000 more than the gasoline-only RX 330, due in large part to making a lot of luxury options standard on the RX hybrid.

How a hybrid works
All of these hybrids are a marriage of a gasoline engine and an electric motor that is powered by a large battery pack. The battery pack is recharged either when the brakes are applied or through the alternator system of the gasoline engine.

Where they differ is in how the gas and electric motors work together.

Some vehicles operate on the electric motor, while the vehicle is stopped or running at slow speed, then kick over to the gasoline engine at higher speeds. Others use the gasoline and electric power in tandem to boost acceleration.

While all hybrids will get better fuel mileage than comparable gasoline-only vehicles, those designed to run at least part-time on electric power alone will be significantly more fuel-efficient than those that use hybrid technology for added power.

The trend toward more-powerful hybrids has some environmental groups upset. The Alliance to Save Energy complains that car companies are squandering the technology by appealing to some consumers' thirst for faster vehicles.

The National Resources Defense Council also has decried the horsepower trend, not only in hybrids but all vehicles in general. The council contends that if horsepower ratings in all vehicles had stayed at the levels of the mid 1980s, new cars today would have 20-percent greater fuel efficiency, thanks to technology developed since then.

What's the fuel mileage?
So what kind of improved mileage can you expect from a 2005 hybrid vehicle? It depends.

If you buy a Chevrolet Silverado, or its twin the GMC Sierra pickup, with a hybrid electric-V8 power system, your fuel mileage will likely increase by only 1 to 2 miles per gallon over a straight V8 model.

That's because the electric motor comes into play only when the pickup is stopped. At a stoplight, the gasoline-powered V8 shuts off and the electric motor takes over, running the air conditioning, stereo and other accessories. When the light turns green, a tap of the accelerator pedal tells the electric motor to start the gasoline engine, and from then on the V8 operates on its own. In other words, the electric motor is never used until the pickup stops, and the only fuel conservation results from not burning gasoline at stoplights or when idling. Of course, there are no pollutants being emitted at that time, either.

At the other end of the scale is the Honda Insight, which gets the greatest fuel economy of any vehicle sold in America -- a maximum of 66 mpg, according to the federal Environmental Protection Agency, or EPA. The Insight does that by using a small 1-liter, 3-cylinder, 65-horsepower gasoline engine linked to a 13-horsepower electric motor, all packaged in a lightweight, two-seat, aerodynamically styled coupe.

Toyota's Prius also is engineered for maximum fuel mileage in a more conventional four-door sedan package. By running only on battery at some speeds and on gasoline with its 1.5-liter four-cylinder engine at others, the Prius, according to the EPA, can achieve a maximum of 60 mpg.

Maximum EPA highway mpg ratings for the other hybrids:
Honda Civic -- 48 mpg
Honda Accord -- 37 mpg
Ford Escape -- 36 mpg
Mercury Mariner -- 33 mpg
Toyota Highlander -- 33 mpg
Lexus RX 400h -- 31 mpg
Chevrolet Silverado -- 21 mpg
GMC Sierra -- 21 mpg

But will you actually see such efficiency in your hybrid?
Most likely not, because the EPA uses a very controlled laboratory environment that is almost never duplicated by an individual's driving habits. Even if you drive like there's an egg between your foot and the accelerator, it's unlikely you'll regularly see fuel mileage as high as the government ratings on any vehicle, hybrid or not.

Consumer Reports recently tested the Honda Accord V6 Hybrid, which the EPA says should be capable of a maximum of 37 mpg and 32 mpg in combined city/highway driving.

But Consumer Reports found that in its regular driving cycle it could do no better than 25 mpg on average in its Accord Hybrid, just 2 mpg better than a test of a gasoline-only V6 Accord.

A road test that Bankrate did on an Accord Hybrid six months ago resulted in an average of about 28 mpg, a result of a large percentage of highway miles in the test.

Similar published tests of other hybrids show that while they get better fuel mileage than their gasoline counterparts, it's rarely going to be as high as the government sticker on the window says.

What about the environment?
Putting aside for a moment the size of any fuel savings, another appeal of hybrids is the promise that they are doing less damage to the environment than similar, gasoline-only vehicles.

Is that true?

Yes, but with a few caveats.

The EPA, concentrating on global warming, provides ratings for vehicles based on the amount of greenhouse gases produced in a year, expressed in tons. The more fuel a vehicle burns, the more greenhouse gases it emits. So hybrids, by their very nature, will emit fewer harmful gases.

Consider the Ford Escape Hybrid. The EPA estimates that it will produce 5.8 tons of greenhouse gases over a year when driven 15,000 miles. That compares to 8.2 tons for a similar gasoline-only Escape.

But that EPA estimate is based on the assumption that a driver will get an average of 33 mpg from the Escape Hybrid and an average of 23 mpg from the gasoline-only Escape. The amount of harmful emissions depends on your mileage, so it's possible that an individual's driving style could mean fewer greenhouse gas emissions in a gasoline-only Escape than that emitted from an Escape Hybrid whose driver always has the pedal to the metal.

And there's another -- as-yet-unexplored -- environmental issue with hybrids: What's to be done about recycling or disposal of those highly toxic battery packs when they wear out?

What about maintenance and durability?
As with any new technology, there are going to be questions about reliability, and so far there isn't enough real-world experience to know for sure how hybrids are going to fare over the long haul.

The gasoline engines in either the hybrid or gasoline-only vehicle should hold up equally -- it's the electric side of the equation that's uncertain. The most pressing question concerns the batteries that are essential to any hybrid. Even high-tech batteries have a limited lifespan when it comes to charging and recharging them.

Generally, the battery packs in hybrids are warranted for eight years or between 80,000 and 100,000 miles depending on the manufacturer. Beyond the warranty period, the manufacturers say they are confident the batteries will last much longer -- perhaps for the useful life of the car.

If you had to replace a battery pack today, and it was not covered by warranty, it would cost $2,000 to $4,000, but so far, no manufacturer has reported selling a replacement battery pack for its hybrid models.

Prices are expected to keep dropping, but how much they'll cost when they begin to wear out and are not covered by warranties is anyone's guess.

And, even if an owner gets 80,000 trouble-free miles from a hybrid, what will happen at trade-in time? How attractive will a used Prius, for example, be with 80,000 miles on the odometer and the original battery back still on board?

One small sign of problems may have already appeared. The federal government has opened an investigation into reports that about three dozen 2004-2005 Toyota Prius sedans have had their gasoline engine stall at highway speeds. No injuries were reported and no recall has been ordered.

Two good sources of information about hybrids can be found at Fueleconomy.gov, which is an EPA site, or at Hybridcars.com, which is an enthusiast site.

Are hybrids a good buy?
Based solely on the price of a gallon of gasoline, it makes no economic sense to buy a hybrid in comparison to the same vehicle with a gasoline-only engine.

Look at it this way: A Honda Civic Hybrid with a manual transmission carries a sticker price of $20,415. A comparable Honda Civic EX lists for $18,025. That puts the price difference between the two at $2,390.

Using the EPA fuel-mileage numbers, the Civic Hybrid should get, a combined city/highway, 47 mpg. The gasoline-only Civic should get 34 mpg, for a difference of 13 mpg.

Assume you drive 15,000 miles a year. The gasoline-only vehicle will consume 441 gallons in that distance (15,000 miles divided by 34 mpg is about 441). The hybrid will eat up 319 gallons (15,000 miles divided by 47 is about 319). The difference of 122 gallons, costing $2.50 per gallon, means the hybrid will save you $305 a year.

A sticker price differential of $2,390 means it would take almost eight years to break even ($2,390 divided by $305 is 7.8 years). Even if the cost of gasoline goes to $5 a gallon, the 122 gallon difference would save you $610 and it would still take almost four years ($2,390 divided by $610 is 3.9 years) to recoup the extra cost of the hybrid.

And that's a rosy scenario. The real-world numbers right now are even worse, because you can get a better discount off the list price on a gasoline-only Civic, while the Civic Hybrid is commanding near-list price.

What about tax incentives on hybrids?
True, tax breaks will offset some of the higher costs of a hybrid and reduce the time it would take to break even, but not by much.

If you buy one in 2005, the federal government allows a one-time $2,000 tax deduction, which would mean about $500 in the pocket of someone who's in the 25-percent tax bracket.

The highway bill passed recently, by Congress, changes the rules for hybrid vehicles bought between 2006 and 2010. Instead of a deduction, there would be a one-time tax credit of between $250 and $3,400, with the amount based on how fuel-efficient the vehicle is compared to a standard set in the law.

Further complicating matters is language in the bill that limits the tax breaks to only so many hybrids per manufacturer, which could benefit U.S. manufacturers just getting started selling hybrids and mean that the plentiful Toyota hybrids may not qualify after 2007.

Some states, particularly California, are offering their own incentives for going hybrid, including the right to cruise the carpool lane. But, as with the federal tax break, those free passes are limited in number, so latecomers to the hybrid revolution could be shut out.

What's the bottom line?
There are some good reasons to buy a hybrid vehicle. It can be less harmful to the environment, and as more people buy hybrids that will encourage manufacturers to further expand the technology which in time will bring down the cost.

It's also impressive technology, and some of the hybrid vehicles are fun to drive. The Prius also has the added, though subjective, benefit of cutting-edge sedan styling.

For performance junkies, some hybrids offer the added thrill of faster acceleration than their gasoline-only counterparts.

But if the dollars and cents of car ownership are your guiding principle, the hybrid revolution has not reached the point where it makes financial sense.

2005-12-14 14:21:04

APPENDIX BB

Hybrids: Save gas, lose money
Consumer Reports says hybrid cars will lose value faster than other cars. Are they right?
By PETER VALDES-DAPENA, CNNMONEY STAFF WRITER

NEW YORK (CNNMoney.com) - Buying a hybrid will save you money on gas...but you might still come out behind.

One of two main reasons, according to a recent analysis by Consumer Reports, is an additional cost that has typically been treated as an unknown: depreciation. Another factor, the report found, is purchase price -- hybrids simply have higher sticker prices than their non-hybrid counterparts, and gas savings don't do nearly enough to close the gap.

According to Consumer Reports' analysis of six hybrid gasoline/electric vehicles, they will lose 2 percent to 3 percent more in value over five years of ownership than otherwise identical non-hybrid vehicles.

With the purchase price difference, depreciation and other costs like financing and insurance factored in, only the Toyota Prius and Honda Civic Hybrid would save owners any money -- $406 and $317, respectively, over 5 years. That final figure includes the impact of a federal tax incentives for hybrids. Without those incentives, Prius buyers face a net cost of ownership of $2,700 more than Corolla buyers.

Other hybrid vehicles would cost owners thousands more than non-hybrids over five years of ownership, even after federal tax credits.

For example, a Toyota Highlander Hybrid costs $7,185 more to purchase than the non-hybrid version. That results in $558 more in sales tax and $2,653 more in financing costs. It also will cost $358 more to insure for five years and $12 more in repair and maintenance costs. In addition, the hybrid will also lose 3.9 percent more in value than the non-hybrid.

The Highlander Hybrid will save you about $1,392 in gasoline over that time. So, even with a $2,200 federal tax credit in your bank account, the Highlander Hybrid will ultimately cost you $5,508 more after five years than a similarly-equipped non-hybrid Highlander.

Figures originally published in Consumer Reports magazine on March 1 showed the cost gap being much larger and none of the hybrid vehicles saving owners any money. A correction posted to the magazine's Website Wednesday morning adjusted for a miscalculation in the rate of depreciation. The corrected figures narrow the gap, but all the hybrid vehices still depreciate at a faster rate than non-hybrids, according to the magazine.

Depreciation debate
Depreciation is a major factor in Consumer Reports' analysis. But, experts say, it's difficult to accurately predict depreciation since few mainstream-targeted hybrid vehicles have entered the used car market.

Hybrid supporter and Prius owner James Bell, publisher of the automotive guide IntelliChoice, recently sold his two-year-old Prius for just $4,000 less than he originally paid for it -- a remarkably low rate of depreciation

Even Bell acknowledges, however, his experience isn't a perfect indicator. Unlike most hybrids, the Prius is a uniquely designed vehicle that exists only as a hybrid. There are still waiting lists for new Priuses at dealerships, so some impatient buyers will look for used ones instead.

And even for the Prius, some experts are saying that, because of hybrid cars' technical complexity and additional costs, used car buyers will become wary of them in years to come.

Still, Bell thinks hybrid cars will hold their value at least as well as, if not better than, regular, non-hybrid vehicles. "We don't see any reason at this point to think that a hybrid is going to track along as an outstanding value and then suddenly crash," he said. In spite of increased production, hybrid systems will likely remain rare enough to command a premium among used car buyers, Bell said.

Nonetheless, there may be more effective ways to save on gas than buying a hybrid. Buying a smaller car, for example, or just getting a smaller engine. "Hybrids are kind of a luxury item," points out Jeff Bliskell, who wrote the feature for Consumer Reports.

Some luxury items that provide a tangible benefit, like heated seats, generally add to a vehicle's resale value. Whether a hybrid powertrain provides a real benefit, and will add to the car's value, will depend on a potential buyer's feelings about the social and environmental impact of fuel consumption.

Raj Sunderam, president of Automotive Lease Guide, a company that predicts residual values of cars for the purpose of calculating lease terms, also sees hybrid cars possibly losing value faster than non-hybrids.

"We would agree with Consumer Reports that this is an area of caution," he said.

But among the unknowns, Sunderam said, is long-term durability. "There's no track record of how they hold up after 80,000 or 100,000 miles," said Sunderam.

As the number of hybrid vehicles available increases, that could also drive used hybrid prices lower. But it could also increase familiarity with the systems and ease potential used car buyers concerns about getting the car serviced, said Sunderam.

Still, said Sunderam, given the issues surrounding hybrid vehicles, the prudent course is to assume they will lose value faster than non-hybrid cars. It will be up to future used car buyers to prove that assumption wrong.

APPENDIX CC

HYBRID CABS TAKE A LICKING… BUT THEIR METERS KEEP ON TICKING

New York cabbies love their hybrids. They're getting better mileage and bigger tips from environmentally conscious fares

The mean streets of San Francisco and New York City are the supreme torture test for any vehicle, let alone a new addition to those cities' taxi fleets in February 2005 and last November, respectively.

So there was good reason for concern among drivers, cab owners and taxi commissions when the first mini-fleets of Escape Hybrid taxis hit the road. Among them:

- Will these off-the-rack, gas-electric sport utilities be able to go where the traditional, full-size sedan cabs with their reinforced suspensions and heavy-duty radiators have gone since the early 20th century — up and down the steep, pot-holed San Francisco hills that only a triathlete could love, and through the legendary Manhattan congestion — 24/7 shift after 24/7 shift?
- Will the new nickel-plated hydride batteries really survive their 100,000-mile warrantees?
- Will cab companies and their drivers save enough on fuel to make up for the roughly $4,000 premium purchase cost of the hybrids?
- And will their fares be willing to trade off a couple of inches of legroom for going green?

So far, so good, say cab company owners, drivers and the taxi commissioners in both cities.

As the 30 San Francisco Escape Hybrid taxis are beginning to hit the 100,000-mile milestone, owners and drivers report:

- Fuel savings between $20 and $31 over the traditional, full-size sedan cabs per 150- to 300-mile shifts.
- Air conditioning cost on hot days: $5 a shift, about half the sedan-version cost.
- Brakes are lasting twice as long. The reason: The electric engine acts as a second braking system, taking much of the load off the conventional friction brakes, says Tom Watson, Ford Hybrid Electric Vehicle Propulsion System engineering manager, Sustainable Mobility Technologies and Hybrid Programs.

- Several water pumps blew at the 50,000-mile mark, a situation that's been rectified, say Watson and San Francisco cab company owners.
- No legroom complaints from customers, who seem delighted by the novelty of the hybrid and by doing the right thing for the planet.

"Everybody wants to drive them," says Hal Mellegard, general manager of Yellow Cab, which has 23 Escape Hybrid taxis in its fleet. "For the company, it's strictly good PR, but it's money in the drivers' pockets since they pay for their own gas."

John Lazar, president of Luxor Cab, which owns seven Escape Hybrid vehicles, also is pleased: "Drivers love 'em. They're burning about a third of the fuel they used to."

"It's nice to have an SUV that does so well environmentally and saves me about $5,000 a year," adds Allen Gotschberg, a Luxor driver who just rolled over 102,000 miles on his Escape Hybrid taxi.

Both cab companies report they'll wait until the cabs have 125,000 to 150,000 miles on them before making final judgment on the new genre, but the city's goal is to have half its taxi fleet powered by cleaner-energy sources — hybrids and compressed natural gas — by 2008, says Heidi Machen, San Francisco taxi commissioner.

In New York, it's too soon to tell the full benefits of the hybrid taxis, but they've already proven to be popular with cabbies and their customers, says Matthew W. Daus, head of the city's Taxi and Limousine Commission.

"Everybody is most definitely enjoying the green benefits of the hybrids," he says. "And drivers are reporting larger tips because of the environmental and novelty aspects."

Getting the first hybrid cabs onto the streets of New York was a joint effort among the City Council, the taxi commission, and community and environmental groups.

"We're proud of our partnership to improve air quality, reduce dependency on foreign oil and improve the health of New Yorkers while putting more money back into the pockets of the drivers," says Jack Hidary, chairman of SmartTransportation.org, an environmental advocacy group based in New York.

Hidary's group is literally taking the hybrid campaign to the streets of other big cab cities such as Las Vegas and Chicago. Ford is also working with the city of Chicago to put hybrids into service as taxis beginning in 2007.

APPENDIX DD

Honda to Drop a Hybrid and Eventually Offer a New One

By NICK BUNKLEY
Published: May 18, 2006

The Honda Insight, the first gasoline-electric hybrid vehicle to be sold in the United States and the most fuel-efficient car in America, will be discontinued later this year, American Honda said Wednesday.

Honda is dropping the Insight, a quirky two-seater that gets an estimated 66 miles a gallon with a manual transmission and can go 670 miles on a tank of gas, because it is preparing to introduce a new hybrid vehicle in 2009.

Analysts say Honda hopes the Insight's replacement, which will be smaller and significantly less expensive than the Civic hybrid, will put it on a more equal footing with the Prius, which has become a favorite among environmentalists and Hollywood celebrities.

Although it reached the market first, the Insight "quickly got to be a rather forgotten car," said Philip Reed, consumer advice editor for Edmunds.com, an automotive Web site that offers buying advice and other car information.

Mr. Reed said the Insight, which costs about $20,000, represented more of a statement about Honda's commitment to fuel economy than a vehicle intended to have mass appeal.

In addition to its small interior, the Insight's popularity was undoubtedly hindered by its exterior. Mr. Reed described the Insight, designed in a teardrop shape to minimize wind resistance, as "sort of Flash Gordonish â€" what we thought the future was going to look like back in 1960."

Honda officials refused to give details about the new hybrid, but said they wanted to focus on small vehicles before introducing larger gas-electric offerings. "Hybrid technology works best in smaller vehicles," said John W. Mendel, senior vice president of American Honda's auto operations.

Honda said it hoped to sell at least 100,000 a year of its new hybrid, which will be built in Japan.

APPENDIX EE

Friday, May 5, 2006
Ford tests the high-end market
Specialty editions will add luxury to Super Duty line
Niche trucks bring big profits
By Robert Schoenberger

For the 2007 model year, Ford will offer two specialty editions of the F-Series Super Duty line: the Outlaw, a black crew-cab diesel; and the Highline, a red, white or black SuperCab model available with gas or diesel engines. The trucks go into production May 13.

Following the successes of Harley-Davidson-themed trucks and the ultra-swanky King Ranch editions, Ford officials said they are trying to offer more luxury trucks because buyers want them and are willing to pay a premium.

The Outlaw package will add nearly $1,600 to the price of a truck that starts at $43,000, while the Highline package will add $930 to the base price of $33,565.

Art Spinella, president of CNW Marketing Research in Bandon, Ore., said automakers are increasingly turning to specialty versions of their vehicles to build profits.

"The market has gotten to the point where niche vehicles are absolutely essential," Spinella said.

In 1990, 80 percent of new-car customers said they were buying to replace a nonoperational vehicle, he said.

Last year, that figure had fallen to 17 percent.

"Quality has improved so much that it's easy to postpone making a new-vehicle purchase for a long time," Spinella said. So automakers have to lure customers with vehicles designed to match their tastes.

When it comes to people who buy Ford's heavy-duty trucks, he said contractors and ranchers who need them for work will continue buying less expensive versions.

But recreational buyers, who want big trucks for show or to tow boats and trailers, often are willing to pay for extra features.

"The King Ranch (edition) proved that those buyers wanted to make a fashion statement with their trucks," Spinella said. He was referring to Ford's top-of-the-line pickup, which features leather seats and luxury amenities.

Between its F-150 and Super Duty lines, Ford sold about 40,000 King Ranch models last year. The Super Duty King Ranch starts at $43,390 and can exceed $50,000 with options such as four wheel drive or a diesel engine.

Ford has been testing the limits of truck luxury. In January, it began showing a concept truck called the F-250 Super Chief that features a dry bar, a cigar humidor and ottomans for rear-seat passengers.

"Every luxury truck we've made has sold well, so we're asking, 'What's the ceiling on luxury?' " Edward Golden, Ford's director of truck design, said during the Super Chief's unveiling at the North American International Auto Show in Detroit.

On the down side, more specialty models mean more complexity. The number of choices already available on the Super Duty Line is staggering. With three engine choices, five trim levels, three cab sizes and two bed sizes, there are more than 100 variations on both the F-250 and F-350 pickups. Adding the specialty editions could bring that to about 125 variations, Spinella said.

APPENDIX FF

U.S. Makers Facing Glut of S.U.V.'s as Gas Rises

For the first time, Toyota became the nation's No. 3 car seller for the month, passing DaimlerChrysler. That was a symbolic victory for Toyota, which occasionally outsells Chrysler but had never outsold all of DaimlerChrysler, including Mercedes-Benz, in the United States.

The latest surge in gas prices poses a long-term problem for the domestic auto companies, which had been hoping that gas prices would moderate and make S.U.V. sales easier. Now, analysts warn it may be harder to get consumers to buy a gas-thirsty vehicle when the oil market remains so volatile.

"Last fall when we had this first spike, then people could write it off as a one-time deal," said Stephen J. Hoch, a professor of marketing at the Wharton School of the University of Pennsylvania. "The fact that it spikes twice means it can spike again. Now, this time people will say there's enough evidence that this is going to be a recurring if not frequent phenomenon."

Last month, big S.U.V.'s and pickup trucks were among the vehicles that had the sharpest sales drops. The Ford Explorer was down 42 percent compared with April 2005. Sales of the Jeep Grand Cherokee declined 41 percent. Sales of Ford's top-selling F-Series pickup fell about 9 percent last month, as did sales of the Nissan Titan. The Chevrolet Colorado pickup was down almost 30 percent.

"I think all truck-based S.U.V.'s are on a downward path," George Pipas, Ford's chief sales analyst, said Tuesday. Noting the unabated decline of Ford's large S.U.V.'s, he said, "It's pretty eye-popping."

That complicates the fortunes of G.M. and Ford. Both companies have begun sweeping overhaul plans, which will eliminate a combined 60,000 jobs and close all or part of more than two dozen factories in North America.

But shutting plants and getting rid of employees will not ease all of their woes. So, the two companies are looking to their product portfolios to help accelerate their turnarounds. Especially at G.M., large S.U.V.'s have been assigned a huge role. Already this year, the company introduced new models of its Chevrolet Tahoe, Cadillac Escalade and GMC Yukon. Next month, the Chevrolet Suburban also goes on sale, and will be followed by several new large pickup trucks later this year.

"Frankly, the portfolios they have were designed for $1.50-a-gallon gasoline," said Walter S. McManus, a scientist with the Transportation Research Institute at the University of Michigan. "So they're going to have trouble. The longer prices stay high, the harder it will be to sell S.U.V.'s."

For now, G.M.'s new S.U.V.'s are selling well. Last month, the company said sales of its Yukon and Tahoe were up more than 30 percent. Escalade sales jumped 127 percent. The success of the new S.U.V.'s helped offset sales declines among other G.M. S.U.V.'s and pickups, which in many cases fell by double digits. Over all, light truck sales at G.M. rose 1.5 percent. Car sales, meanwhile, dropped 18.3 percent.

Competition from foreign makers has already chipped away at the domestic auto companies' share of the pickup and S.U.V. market. In the late 1990's when S.U.V. sales were booming, G.M., Ford and Chrysler sold four out of five S.U.V.'s and pickup trucks in the United States, according to Autodata. By last year, their share had dropped to about two-thirds of the American pickup and S.U.V. market. That drop came as companies like Hyundai entered the S.U.V. market for the first time and Toyota and Honda introduced new light truck models.

APPENDIX GG

There IS a problem with global warming... it stopped in 1998
By Bob Carter
(Filed: 09/04/2006)

For many years now, human-caused climate change has been viewed as a large and urgent problem. In truth, however, the biggest part of the problem is neither environmental nor scientific, but a self-created political fiasco. Consider the simple fact, drawn from the official temperature records of the Climate Research Unit at the University of East Anglia, that for the years 1998-2005 global average temperature did not increase (there was actually a slight decrease, though not at a rate that differs significantly from zero).

Yes, you did read that right. And also, yes, this eight-year period of temperature stasis did coincide with society's continued power station and SUV-inspired pumping of yet more carbon dioxide into the atmosphere.

In response to these facts, a global warming devotee will chuckle and say "how silly to judge climate change over such a short period". Yet in the next breath, the same person will assure you that the 28-year-long period of warming which occurred between 1970 and 1998 constitutes a dangerous (and man-made) warming. Tosh. Our devotee will also pass by the curious additional facts that a period of similar warming occurred between 1918 and 1940, well prior to the greatest phase of world industrialisation, and that cooling occurred between 1940 and 1965, at precisely the time that human emissions were increasing at their greatest rate.

Does something not strike you as odd here? That industrial carbon dioxide is not the primary cause of earth's recent decadal-scale temperature changes doesn't seem at all odd to many thousands of independent scientists. They have long appreciated - ever since the early 1990s, when the global warming bandwagon first started to roll behind the gravy train of the UN Inter-governmental Panel on Climate Change (IPCC) - that such short-term climate fluctuations are chiefly of natural origin. Yet the public appears to be largely convinced otherwise. How is this possible?

Since the early 1990s, the columns of many leading newspapers and magazines, worldwide, have carried an increasing stream of alarmist letters and articles on hypothetical, human-caused climate change. Each such alarmist article is larded with words such as "if", "might", "could", "probably", "perhaps", "expected", "projected" or "modelled" - and many involve such deep dreaming, or ignorance of scientific facts and principles, that they are akin to nonsense.

The problem here is not that of climate change per se, but rather that of the sophisticated scientific brainwashing that has been inflicted on the public, bureaucrats and politicians alike. Governments generally choose not to receive policy advice on climate from independent scientists. Rather, they seek guidance from their own self-interested science bureaucracies and senior advisers, or from the IPCC itself. No matter how accurate it may be, cautious and politically non-correct science advice is not welcomed in Westminster, and nor is it widely reported.

Marketed under the imprimatur of the IPCC, the bladder-trembling and now infamous hockey-stick diagram that shows accelerating warming during the 20th century - a statistical construct by scientist Michael Mann and co-workers from mostly tree ring records - has been a seminal image of the climate scaremongering campaign. Thanks to the work of a Canadian statistician, Stephen McIntyre, and others, this graph is now known to be deeply flawed.

There are other reasons, too, why the public hears so little in detail from those scientists who approach climate change issues rationally, the so-called climate sceptics. Most are to do with intimidation against speaking out, which operates intensely on several parallel fronts.

First, most government scientists are gagged from making public comment on contentious issues, their employing organisations instead making use of public relations experts to craft carefully tailored, frisbee-science press releases. Second, scientists are under intense pressure to conform with the prevailing paradigm of climate alarmism if they wish to receive funding for their research. Third, members of the Establishment have spoken declamatory words on the issue, and the kingdom's subjects are expected to listen.

On the alarmist campaign trail, the UK's Chief Scientific Adviser, Sir David King, is thus reported as saying that global warming is so bad that Antarctica is likely to be the world's only habitable continent by the end of this century. Warming devotee and former Chairman of Shell, Lord [Ron] Oxburgh, reportedly agrees with another rash statement of King's, that climate change is a bigger threat than terrorism. And goodly Archbishop Rowan Williams, who self-evidently understands little about the science, has warned of "millions, billions" of deaths as a result of global warming and threatened Mr Blair with the wrath of the climate God unless he acts. By betraying the public's trust in their positions of influence, so do the great and good become the small and silly.

Two simple graphs provide needed context, and exemplify the dynamic, fluctuating nature of climate change. The first is a temperature curve for the last six million years, which shows a three-million year period when it was several degrees warmer than today, followed by a three-million year cooling trend which was accompanied by an increase in the magnitude of the pervasive, higher frequency, cold and warm climate cycles. During the last three such warm (interglacial) periods, temperatures at high latitudes were as much as 5 degrees warmer than today's. The second graph shows the average global temperature over the last eight years, which has proved to be a period of stasis.

The essence of the issue is this. Climate changes naturally all the time, partly in predictable cycles, and partly in unpredictable shorter rhythms and rapid episodic shifts, some of the causes of which remain unknown. We are fortunate that our modern societies have developed during the last 10,000 years of benignly warm, interglacial climate. But for more than 90 per cent of the last two million years, the climate has been colder, and generally much colder, than today. The reality of the climate record is that a sudden natural cooling is far more to be feared, and will do infinitely more social and economic damage, than the late 20th century phase of gentle warming.

The British Government urgently needs to recast the sources from which it draws its climate advice. The shrill alarmism of its public advisers, and the often eco-fundamentalist policy initiatives that bubble up from the depths of the Civil Service, have all long since been detached from science reality. Intern-ationally, the IPCC is a deeply flawed organisation, as acknowledged in a recent House of Lords report, and the Kyoto Protocol has proved a costly flop. Clearly, the wrong horses have been backed.

As mooted recently by Tony Blair, perhaps the time has come for Britain to join instead the new Asia-Pacific Partnership on Clean Development and Climate (AP6), whose six member countries are committed to the development of new technologies to improve environmental outcomes. There, at least, some real solutions are likely to emerge for improving energy efficiency and reducing pollution.

Informal discussions have already begun about a new AP6 audit body, designed to vet rigorously the science advice that the Partnership receives, including from the IPCC. Can Britain afford not to be there?

• Prof Bob Carter is a geologist at James Cook University, Queensland, engaged in paleoclimate research

APPENDIX HH

Thursday, May 4, 2006
Ford, GM: Gas prices near peak
Automakers disagree on effect on buyers
By Robert Schoenberger

"We don't expect (oil) to get to a price range when it would affect behavior," Wagoner said. He added that prices would have to climb well in excess of $3 per gallon to significantly hurt consumers.

Most automakers saw declines in truck and SUV sales last month. GM was the notable exception, with strong demand for redesigned Cadillac Escalade, GMC Yukon and Chevrolet Tahoe models.

Wagoner said the results mean many consumers still want big, powerful vehicles that use lots of fuel.

At Ford, however, sales of the Louisville-built Explorer SUV are down 30 percent so far this year compared with the first four months of last year. During a conference call Tuesday, Ford sales analyst George Pipas said SUV sales have been declining for more than a year as crossovers -- SUV-like vehicles built off car designs instead of truck frames -- cut into sales.

Ford had predicted that by the end of this decade, cars and crossovers would overtake trucks and SUVs as the most popular category of vehicles in the United States. Rising gas prices have speeded that transition, he said.

"We're already seeing our end-of-decade forecasts," Pipas said. "Fuel prices are obviously a factor."

He added that despite the falling sales of SUVs, the vehicles remain popular with a group of buyers and Ford will continue making them for a very long time.

APPENDIX II

Have you driven a Freedom CAR lately?

May 13, 2006
by Dave Cloud

An article in the September 2001 issue of The American Enterprise (TAE) magazine ("The Car of the Future?") detailed the U.S. governmentâ€™s comical attempt at industrial planning called the Partnership for a New Generation of Vehicles (PNGV). The coalition of the then Big Three automakers (USCAR), 7 government agencies and 19 national laboratories was set up to, â€œBuild a car with up to 80 miles per gallon at the level of performance, utility and cost of ownership that todayâ€™s consumers demand.â€ù Easy, like peeling a turtle.

The program started in 1993 during the Clinton administration. Prototypes were to be developed by 2004 and be in consumersâ€™ driveways a few years later. If you are making plans to order your new wonder car, you might want to hold off. As with most examples of government-led industrial planning, this one flopped like a carp on the riverbank.

After approximately one billion dollars of government funding, there is no car, no hope of one and only continued bureaucratic double talk. The program was good for the politicians, especially for the titular head of the program, Vice President Al Gore. Gore and his buddies could proudly point to how much they were doing to make the world a better place. The automakers also loved the program since they could use it as a shield against the wrath of environmental groups who were up in arms about the growing sales of low-mileage trucks and SUVs. Taxpayers are the one group that is clearly worse off.

Like all useless government programs, the PNGV—in spite of abject faailure—didnâ€™t really end, it just changed names and objectivees. In January of 2002 the Department of Energy and USCAR, which had already abandoned the 80-mpg goal, announced a new initiative called Freedom CAR, which will â€œfund research into advanced, efficient fuel cell technology, which uses hydrogen to power automobiles without creating any pollution. The long-term results of this cooperative effort will be cars and trucks that are efficient, cheaper to operate, pollution-free and competitive in the showroom.â€ù Sound familiar?

At least the bureaucrats can learn. After stating that any resulting cars may not hit the market for 10-20 years, the final paragraph of the press release announcing the new program includes this gem: â€œNo numerical targets for energy efficiency or emissions of the Freedom CAR have been announced.â€ù But we didnâ€™t say they learned well. While the last paragraph attempts to make clear that there will be no goals for emissionsâ€”which means they canâ€™t really fail—the stated mission of the project is a â€œpollution-freeâ€ù car.

So now we will be funding an effort that has specifically stated that it will not be trying to meet its stated goals.

Dave Cloud is a high school economicsÂ teacherÂ andÂ frequent columnist with The American Enterprise Online.

APPENDIX JJ

For Leading Exxon to Its Riches, $144,573 a Day

By JAD MOUAWAD
Published: April 15, 2006

http://www.nytimes.com/2006/04/15/business/15pay.html?pagewanted=allUnder Lee R. Raymond, the market value of Exxon Mobil increased fourfold to $375 billion, overtaking BP as the largest oil company.

Shareholders benefited handsomely on Mr. Raymond's watch. The price of Exxon's shares rose an average of 13 percent a year. The company, now known as Exxon Mobil, paid $67 billion in total dividends.

For his efforts, Mr. Raymond, who retired in December, was compensated more than $686 million from 1993 to 2005, according to an analysis done for The New York Times by Brian Foley, an independent compensation consultant. That is $144,573 for each day he spent leading Exxon's "God pod," as the executive suite at the company's headquarters in Irving, Tex., is known.

Despite the company's performance, some Exxon shareholders, academics, corporate governance experts and consumer groups were taken aback this week when they learned the details of Mr. Raymond's total compensation package, including the more than $400 million he received in his final year at the company.

"It's entrepreneurial returns for managerial conduct," said Charles M. Elson, the director of the John L. Weinberg Center for Corporate Governance at the University of Delaware. "Exxon was there long before Mr. Raymond was there and will be there long after he leaves. Yet he received Rockefeller returns without taking the Rockefeller risk."

Thanks to his strategy, the company each day produces 2.5 million barrels of oil — more than Kuwait — and 9.2 billion cubic feet of natuatural gas. It is the world's top refiner and controls 22 billion barrels of oil reserves, the most among its publicly traded peers.

Still, Mr. Raymond's package for 2005 stands out, even stripping the $98 million lump-sum value of his pension plan. He received $19.9 million in salary, bonus and other incentives for 2005. He made $21.2 million on options he exercised last year. And he was awarded 550,000 restricted shares, bringing the total he owns to 3.26 million, with a value of $199 million, at $61 a share, an average of Exxon's share price since March 1. Some of the restricted shares vest in 5 and 10 years. He owns more options that hold a value of $69.6 million.

"He served his stockholders well and the American public poorly," said Mark Cooper, the research director at the Consumer Federation of America.

"Exxon's performance has more to do with commodity prices than any strategy vis-Ã -vis its competitors," he said. "Everyone had a good year in the oil business."

But for most experts, the most problematic aspect of Mr. Raymond's package was his $98.4 million pension, which he elected to take as a lump-sum payment instead of annualized returns that would last through his retirement years. Also, the value of the pension rose in 2005 by about 20 percent, in large part because it was based on his final year of income. The final amount was not disclosed until the last proxy statement.

The Securities and Exchange Commission is considering new rules for the 2007 proxy season, which may require disclosure of far more detail about how compensation committees set pay for top corporate officers. The agency also would force companies to provide more information about the perks, retirement packages and post-employment compensation they award the most senior employees.

The board of Exxon Mobil includes Hank McKinnell, the chairman of Pfizer. When he retires in 2008, Mr. McKinnell will receive a pension benefit now worth $83 million, according to the company's proxy filing. That was the largest for a chief executive at any of the companies in the Standard & Poor's 500-stock index until Mr. Raymond's pension was made public.

APPENDIX KK

Extreme Hybrids
AP

By TIM MOLLOY, AP

CORTE MADERA, Calif. (Aug. 14) - Politicians and automakers say a car that can both reduce greenhouse gases and free America from its reliance on foreign oil is years or even decades away. Ron Gremban says such a car is parked in his garage.

It looks like a typical Toyota Prius hybrid, but in the trunk sits an 80-miles-per-gallon secret ? a stack of 18 brick-sized batteries that boosts the car's high mileage with an extra electrical charge so it can burn even less fuel.

Gremban, an electrical engineer and committed environmentalist, spent several months and $3,000 tinkering with his car.

Like all hybrids, his Prius increases fuel efficiency by harnessing small amounts of electricity generated during braking and coasting. The extra batteries let him store extra power by plugging the car into a wall outlet at his home in this San Francisco suburb ? all for about a quarter.

He's part of a small but growing movement. "Plug-in" hybrids aren't yet cost-efficient, but some of the dozen known experimental models have gotten up to 250 mpg.

They have support not only from environmentalists but also from conservative foreign policy hawks who insist Americans fuel terrorism through their gas guzzling.

And while the technology has existed for three decades, automakers are beginning to take notice, too.

So far, DaimlerChrysler AG is the only company that has committed to building its own plug-in hybrids, quietly pledging to make up to 40 vans for U.S. companies. But Toyota Motor Corp. officials who initially frowned on people altering their cars now say they may be able to learn from them.

"They're like the hot rodders of yesterday who did everything to soup up their cars. It was all about horsepower and bling-bling, lots of chrome and accessories," said Cindy Knight, a Toyota spokeswoman. "Maybe the hot rodders of tomorrow are the people who want to get in there and see what they can do about increasing fuel economy."

The extra batteries let Gremban drive for 20 miles with a 50-50 mix of gas and electricity. Even after the car runs out of power from the batteries and switches to the standard hybrid mode, it gets the typical Prius fuel efficiency of around 45 mpg. As long as Gremban doesn't drive too far in a day, he says, he gets 80 mpg.

"The value of plug-in hybrids is they can dramatically reduce gasoline usage for the first few miles every day," Gremban said. "The average for people's usage of a car is somewhere around 30 to 40 miles per day. During that kind of driving, the plug-in hybrid can make a dramatic difference."

Backers of plug-in hybrids acknowledge that the electricity to boost their cars generally comes from fossil fuels that create greenhouse gases, but they say that process still produces far less pollution than oil. They also note that electricity could be generated cleanly from solar power.

Gremban rigged his car to promote the nonprofit CalCars Initiative, a San Francisco Bay area-based volunteer effort that argues automakers could mass produce plug-in hybrids at a reasonable price.

But Toyota and other car companies say they are worried about the cost, convenience and safety of plug-in hybrids ? and note that consumers haven't embraced all-electric cars because of the inconvenience of recharging them like giant cell phones.

Automakers have spent millions of dollars telling motorists that hybrids don't need to be plugged in, and don't want to confuse the message.

Nonetheless, plug-in hybrids are starting to get the backing of prominent hawks like former CIA director James Woolsey and Frank Gaffney, President Reagan's undersecretary of defense. They have joined Set America Free, a group that wants the government to spend $12 billion over four years on plug-in hybrids, alternative fuels and other measures to reduce foreign oil dependence.

Gaffney, who heads the Washington, D.C.-based Center for Security Policy, said Americans would embrace plug-ins if they understood arguments from him and others who say gasoline contributes to oil-rich Middle Eastern governments that support terrorism.

"The more we are consuming oil that either comes from places that are bent on our destruction or helping those who are ... the more we are enabling those who are trying to kill us," Gaffney said.

DaimlerChrysler spokesman Nick Cappa said plug-in hybrids are ideal for companies with fleets of vehicles that can be recharged at a central location at night. He declined to name the companies buying the vehicles and said he did not know the vehicles' mileage or cost, or when they would be available.

Others are modifying hybrids, too.

Monrovia-based Energy CS has converted two Priuses to get up to 230 mpg by using powerful lithium ion batteries. It is forming a new company, EDrive Systems, that will convert hybrids to plug-ins for about $12,000 starting next year, company vice president Greg Hanssen said.

University of California, Davis engineering professor Andy Frank built a plug-in hybrid from the ground up in 1972 and has since built seven others, one of which gets up to 250 mpg. They were converted from non-hybrids, including a Ford Taurus and Chevrolet Suburban.

Frank has spent $150,000 to $250,000 in research costs on each car, but believes automakers could mass-produce them by adding just $6,000 to each vehicle's price tag.

Instead, Frank said, automakers promise hydrogen-powered vehicles hailed by President Bush and Gov. Arnold Schwarzenegger, even though hydrogen's backers acknowledge the cars won't be widely available for years and would require a vast infrastructure of new fueling stations.

"They'd rather work on something that won't be in their lifetime, and that's this hydrogen economy stuff," Frank said. "They pick this kind of target to get the public off their back, essentially."

APPENDIX LL

Gas stations in Texas go dry
Problems shipping new ethanol blend gasoline cause shortages at stations around Houston and Dallas .
April 28, 2006: 12:07 PM EDT

Dozens of service stations around Houston and Dallas, the heart of the U.S. oil industry, are out of gasoline after transportation problems resurfaced with the switch to a new anti-smog fuel blend using ethanol, suppliers said Friday.

American drivers, heading into the summer vacation season, have already seen a spike of more than 40 cents a gallon in a month to an average nationwide pump price of $2.93 per gallon, tracking record crude oil costs.

"We have had a few spot outages in the greater Houston area, but most have been short-lived," said Stan Mays, a spokesman for Motiva, which is a joint refinery venture between Royal Dutch Shell and Saudi Refining.

Mays said about 60 out of 400 gas stations had problems in the greater Houston area, but Motiva expects to complete the conversion from storage of MTBE-based gasoline to ethanol-based gasoline this weekend.

Ethanol-based reformulated gasoline easily absorbs water, so it cannot be sent in pipelines to terminals and then trucked to gas stations like conventional gasoline.

This is the second time in April that Dallas has experienced shortages of gasoline. Last week, dozens of gasoline stations on the East Coast ran out of gasoline and two states, Maryland and Pennsylvania, requested fuel waivers from the EPA.

"Each of these isolated circumstances that we are tracking appear to be manageable at this point," the EPA spokesman said. "So going into the weekend it looks like the situations are manageable and improving."

The EPA is still mulling their requests for waivers, the spokesman said.

APPENDIX MM

By MATTHEW L. WALD
Published: May 6, 2006

Nine months after Congress passed major energy legislation, one provision affecting gasoline formulas is helping to drive the price of gas up much faster than the rising price of crude oil.

And because the new gasoline recipe contains less energy, mileage per gallon is declining.

On Friday, the 270th day after President Bush signed the Energy Policy Act of 2005, the law ended the requirement that gasoline sold in areas prone to air pollution include an "oxygenate," or a molecule including hydrogen, carbon and oxygen. A result is that refiners over most of the country's big gasoline markets, anticipating the rule, have already dropped the chemical MTBE.

Until the oxygen requirement was eliminated, refiners had made gasoline with 11 percent MTBE by volume. "MTBE is not a tiny little additive that you add with an eye dropper," said James P. Lucier, an analyst at Prudential Equity Group.

But now refiners must replace that ingredient. And they need a substitute that is also high octane, as MTBE is.

To replace it, refiners have turned in part to ethanol, which is also an oxygenate but not a pollution worry.

Ethanol, which is made from corn, costs more than gasoline, though, and shipping it from the Midwest, where it is made, is cumbersome and expensive, because it has to go by barge, railroad tank car or tanker truck, rather than pipeline.

Along with importing vast amounts of crude oil, the United States imports more than a million barrels a day of gasoline or gasoline ingredients. The loss of the MTBE now requires more of those imports. Larry Goldstein, president of the Petroleum Industry Research Foundation, a nonprofit group in New York, said tight refinery capacity helped to explain why the price of gasoline had increased so much faster than the price of crude oil.

West Texas Intermediate, the American benchmark oil, was up only about 39 cents a gallon last month compared with April 2005, while the wholesale price of gasoline rose about 64 cents over the same period. Mr. Goldstein blames the loss of MTBE for the difference.

Ethanol is pricey and energy-poor. Its price is up by about $1.30 a gallon in the last year, in part because of heavy demand for something to replace MTBE. But ethanol has only about two-thirds as much energy as MTBE does.

The oxygenate requirement has been obsolete for years. It was intended to make the fuel mix leaner, reducing air pollution. But that works only on older cars, with carburetors, not in modern vehicles with oxygen sensors and fuel injectors.

APPENDIX NN

Updated:2006-04-27 17:23:29
Are There Problems with E85?
By ED WALLACE || BUSINESSWEEK ONLINE
BusinessWeek online

During the comment period for the RFG (reformulated gas) program, supporters of ethanol had argued that the volatile organic compound (VOC) emission standards in the program -- 42 U. S. C. 7545 (k) (3) (B) (i) -- would preclude the use of ethanol in RFG because adding ethanol to gasoline increases its volatility and raises VOC emissions, especially in the summertime.

Background
The American Petroleum Institute v. the U.S. Environmental Protection Agency [Docket #94-1502 (Heard by the U. S. Court of Appeals for the District of Columbia Circuit and decided on April 28, 1995)]

If there were ever a time when the truth in advertising standards should be put back into place, it's now -- during the current (third) attempt to convince the public that the massive use of corn-derived ethanol in our gasoline supply will alleviate our need for foreign oil. Ultimately, the answer to just one question determines ethanol's actual usefulness as a gasoline extender: "If the government hadn't mandated this product, would it survive in a free market?" Doubtful -- but the misinformation superhighway has been rerouted to convince the public its energy salvation is at hand.

Act I, Scenes 1 and 2
The use of ethanol to reduce our dependence on foreign oil is nothing new. We also considered it during our nation's Project Independence in 1974, the year after the first Arab oil embargo. After the second energy crisis in 1979, an income tax credit of 40 cents per gallon of 190-proof ethanol produced was instituted as an incentive for refiners of ethanol to blend this product into gasoline.

Because this federal largesse now existed, within five years, 163 ethanol plants had been built -- but only 74 of them were still in operation. As gasoline availability opened up in the 1980s and gas prices went down, many ethanol plants simply went out of business.

APPENDIX OO

Diesel a Savior in Squeeze on Energy? Obstacles Exist

By MATTHEW L. WALD
Published: May 29, 2006

http://www.nytimes.com/2006/05With a new kind of diesel fuel entering the market in the next few days; new technologies that vastly reduce problems with noise, smell and performance; and federal tax benefits like the ones offered for hybrid-electric vehicles, car manufactures are hoping to get consumers excited about more diesel-powered cars and sport utility vehicles.

But some experts caution that there may be less there than meets the eye. For one thing, diesel is still a form of petroleum, and the ability of refineries to produce it in lieu of gasoline is limited. And it would take expensive investment to change the gasoline-to-diesel production ratio.

In Europe, diesel demand is high and growing by 1.5 percent a year, and "that's impossible to accommodate in a refinery," said Gene Tunison, manager of fuels development and policy planning at ExxonMobil.

Instead, European refineries are processing more crude oil to keep up with diesel demand and accumulating surplus gasoline that they export to the United States.

That system is working because the United State has a shortage of refinery capacity, but if every country were to embark on a diesel strategy, refining would have to change radically, experts say.

Today, gasoline accounts for about half of what American refineries produce. An additional 25 percent is diesel or home-heating oil, and about 10 percent is jet fuel.

But new technology and regulatory policy are creating the possibility of more attractive diesel vehicles. Beginning June 1, refineries must produce what is known as ultra-low sulfur diesel, with no more than 15 parts per million of sulfur, down from 500 parts per million. Removal of sulfur will allow car companies to install filters to catch soot (current diesel fuel would overwhelm a filter).

While low-sulfur content fuel has allowed the introduction of cleaner vehicles, other technologies that will limit emission of nitrogen oxides, an ingredient of smog, will probably be on the road around 2008. And new computerized controls that inject fuel more efficiently have increased power and reduced noise, so that diesel engines are often indistinguishable from gasoline engines.

Diesel goes farther for two reasons. One is that when the hydrocarbons in a barrel of oil are rearranged and sorted into a variety of products, the ones going into diesel have more energy than those that go into gasoline. A gallon of diesel has about 128,000 B.T.U.'s, while gasoline has about 115,000.

The second reason is energy efficiency. Diesel engines get more work out of each B.T.U. because they squeeze the fuel-air mixture tighter before combustion.

But Lee Schipper, a former oil industry executive who leads a transportation and environmental study program at the World Resources Institute, said that what pushed European drivers to diesel was tax policy. Diesel buyers there tend to drive more, he said however, so they save no net fuel.

For the United States, he wondered whether it was "worth converting refineries and all that, to save what you would ultimately save, when you might get the same improvement from hybridization and improvement in gasoline technologies?"

APPENDIX PP

April 26, 2006, 8:59PM
Diesel vehicle sales rumble to sharp gain
By DEE-ANN DURBIN
Associated Press

There were 543,777 new diesel vehicles registered in 2005, compared with 301,471 five years earlier, according to data compiled by the Southfield, Mich.-based auto information company R.L. Polk & Co. and released by the Diesel Technology Forum.

That was partly because there were more diesels to choose from.

In 2000, there were only 12 diesel passenger vehicles available on the U.S. market. By 2005, that had jumped to 22 vehicles, according to Allen Schaeffer, executive director of the Maryland-based Diesel Technology Forum.

The trend of choosing diesel engines was most noticeable among buyers of heavy-duty pickups, including the Ford F-250 and F-350, Chevrolet Silverado 2500/3500 and Dodge Ram 2500/3500. In 2000, 54 percent of them chose diesels, rising to 63 percent in 2005.

Diesels represented 3.6 percent of all new vehicles in the U.S. market in 2005, up from 2.3 percent in 2000. By comparison, hybrids made up about 1.5 percent of the new vehicle market last year.

APPENDIX QQ

Crossing the 'Green' Line
First Drive: 2007 Saturn Vue Green Line Hybrid
By REX ROY

Catch him on a bad day, and Kermit will tell you, it isn't easy being green. But automotively speaking, that's about to change.

Turn the key in the 2007 Saturn Vue Green Line hybrid and it drives like a well-sorted, peppy crossover. That's exactly the point. GM Powertrain engineers weren't trying to save the world with technology that takes a postgraduate engineering degree to appreciate or operate. People like Steve Tarnowsky, the assistant chief engineer of GM Hybrid Systems, simply wanted to build a hybrid that made sense to buy and drive.

Balancing technology and value
"We think we've hit a real balance between technology, fuel economy and price," said Tarnowsky. The Vue Green Line promises to deliver a 20-percent improvement in fuel economy over a standard Vue with a four-cylinder engine. Additionally, the Green Line shaves about 1 second from the 0-to-60-mph time. This added performance and economy can be yours for about $23,000, easily making the Green Line the least expensive hybrid SUV on the market.

From the outside, looking at the Green Line is like looking at any other Vue. Only the Hybrid badge on the fender identifies this tree-hugger special.

Inside, the story is similar. Close inspection of the instruments reveals a charge gauge that indicates when power is being added to or sucked from the onboard battery pack. Once under way, a telltale light illuminates "ECO" (for economy) when you're driving in a frugal manner -- beating the EPA's fuel-economy figures. For those who pay attention to the tachometer, it has a position below zero rpm. Interesting, eh? The needle points there when the gasoline engine is not running in situations such as being stopped at a traffic light.

A different kind of hybrid
In contrast to the "I'm not shouting to the world I'm a hybrid" exterior, the engine bay immediately indicates that this is no standard Vue. First clue? The enormous trim panel with the large Hybrid badge. This panel covers the hybrid-specific controllers needed to make the Green Line so green. Left of the panel, you'll see a specially tuned 2.4-liter Ecotec four-cylinder and a nondescript mass of additional hardware. And while you can't see it from above, there's also a modified Hydra-matic four-speed automatic transmission underneath.

The star of this engineering show is the motor-generator. Hung off the side of the engine in plain view, the unit looks like an oversized alternator. It not only performs the function of an alternator, but has the ability to deliver torque back to the gasoline engine. Like most other hybrids, the gasoline engine shuts down when the Vue is at rest.

Electric power for the power steering, climate control and other accessories is driven by a modest battery pack. As the driver's foot releases the brake pedal, the motor-generator spins the engine's crankshaft up to speed in order to assist the gasoline engine with a smooth launch from a stop. The motor is also capable of providing additional torque when maximum acceleration is called for.

No-excuses performance
The package produces 170 horsepower and 164 pound-feet of torque, with another 115 lb-ft of torque from the electric motor. Official EPA fuel economy numbers aren't in yet, but GM estimates 27 mpg city and 32 mpg highway, with a combined figure of 29 mpg. Although that's a solid 20-percent gain over the standard Vue's 25 mpg, it's well below the fuel mileage of the Ford Escape/Mercury Mariner hybrids (36 city/31 highway).

Driving the Green Line is an exercise in the normal. Most drivers won't notice anything unusual until they've stopped at a red light. In most situations, the engine completely stops?as in turnss off. The feeling is not one of an engine stall -- the engine just smoothly shuts down. Of course, all the interior features remain operational, such as the climate control, radio, etc. Lifting off the brake engages the electric motor-generator and smoothly restarts the gasoline engine so you're under way again with no fuss or muss.

Unlike other current hybrids, however, the Green Line does not run any distance on pure electric power; the motor-generator is a hybrid "helper." The net result is that saving fuel has never been more painless.

A new Vue of the market
The Green Line is the fourth Vue model. The standard Vue is powered by a 2.2-liter Ecotec four-cylinder and is front-wheel drive. Vues with a V6 engine come in FWD and AWD configurations. The sporty Vue Red Line tops the range. The Green Line is FWD only. As an additional point of interest, the Vue experienced a major freshening for 2005, and rolls into 2006 as a compact crossover worthy of consideration.

The market will determine whether GM has a hit when the Green Line goes on sale later this year. It's priced thousands below the Toyota Highlander Hybrid and the popular Ford Escape Hybrid, while coming close to matching the fuel economy of their more complex single-mode hybrid systems.

With few exceptions, being an automotive greenie has meant driving vehicles that were slower, more expensive and quirkier than the norm. GM is helping to change that with the 2007 Saturn Vue Green Line. And as time goes on, it will keep getting easier to be green. The Green Line's powertrain will appear in the Chevrolet Malibu for 2007.

APPENDIX RR

The auto club calculates the cost of driving averages more than $7,800 per year, including nearly $3,400 in depreciation and more than $900 for insurance. Fuel to drive 15,000 miles in a year would cost $1,425.

Many people are surprised by how much it costs to own an automobile, said Sean Comey, spokesman for AAA of Northern California.

The auto club's Your Driving Costs study estimates costs of ownership and operation for small, medium and large sedans based on a selection of five popular specific models in each category. Researchers also analyzed the costs of SUV and minivan ownership, but excluded those in the average driving-cost calculation.

Assumptions included cost of new 2006 model cars, minus the estimated used-car value after five years, financing on a five-year loan and insurance on a middle-aged male with a good driving record.

Not surprisingly, the small sedan was the least expensive, with an annual cost of $6,253, assuming 15,000 miles driven. The mid- and full-size cars were pegged at $7,967 and $9,283 a year respectively. The average annual cost of an SUV came in at $9,805 and a minivan at $8,878.

Given the higher cost of the larger specialty cars and trucks, Comey suggested it might be cheaper to rent such vehicles only when needed.

"You don't necessarily need the biggest engine and the biggest car just to go about your business."

Another way to reduce car ownership costs is to buy a used car, said Rosemary Shahan, president of Consumers for Auto Reliability and Safety, a Sacramento consumer education and advocacy group.

"There are a lot of good used cars out there," she said.

But to find a reliable vehicle, Shahan said, "Probably the best thing you can do when out shopping for a car ... is to find a good technician."

"Then for about $100, they will inspect the used car and tell you if it's up to snuff," she said. "That $100 you spend on an inspection can save you thousands."

To find a reliable mechanic, Shahan suggested Internet users visit www.cartalk.com and look at the Mechanic's Files section.

APPENDIX SS

Gallup Surprise: Most Americans Now Say They May Buy Hybrid Cars
By E&P Staff
Published: April 10, 2006 1:45 PM ET
http://www.editorandpublisher.com/eandp/news/article_display.jsp?vnu_content_id=1002314621

Those favoring hybrids show little gender or regional differences, but "hybrids appeal much more to younger and middle-aged Americans than to seniors," Gallup reports. Upper-income Americans are slightly more likely than lower-income Americans (62% vs. 55%) to say they would seriously consider buying a hybrid when purchasing their next car.

According to the poll, 48% say they have cut back significantly on the amount they drive and 54% says they have reduced their household spending on other items because of high gas prices.

"Cutting back on driving is particularly prevalent among lower-income Americans," Gallup reports.

"The income dividing line for a majority striving to save on gas occurs at the $50,000 level. A majority of those living in households earning less than $50,000 per year say they have cut back on driving due to gas prices. Only 36% of those making $50,000 or more say they have done this."

The survey of 1,001 adults was taken March 10-12.

APPENDIX TT

2 Industry Leaders Bet on Coal but Split on Cleaner Approach

By SIMON ROMERO
Published: May 28, 2006

More than a century ago a blustery Wyoming politician named Fenimore Chatterton boasted that his state alone had enough coal to "weld every tie that binds, drive every wheel, change the North Pole into a tropical region, or smelt all hell!" Skip to next paragraph Peabody Energy, left; Brendan McDermid/Reuters, right

Coal, the nation's favorite fuel in much of the 19th century and early 20th century, could become so again in the 21st. The United States has enough to last at least two centuries at current use rates — reserves far greaater than those of oil or natural gas. And for all the public interest in alternatives like wind and solar power, or ethanol from the heartland, coal will play a far bigger role.

But the conventional process for burning coal in power plants has one huge drawback: it is one of the largest manmade sources of the gases responsible for global warming.

It is on this issue, however, that executives of some of the most important companies in the coal business diverge. Their disagreement is crucial in the debate over how to satisfy Americans' energy appetite without accelerating climate change.

One of those executives, Michael G. Morris, runs American Electric Power, the nation's largest coal consumer and biggest producer of heat-trapping carbon dioxide emissions from its existing plants. He is spearheading a small movement within the industry to embrace the new technology. His company plans to build at least two 600-megawatt plants, in Ohio and West Virginia, at an estimated cost of as much as $1.3 billion each.

But most in the industry are not making that bet. Among them is Gregory H. Boyce, chief executive of Peabody Energy, the largest private-sector coal producer in the world thanks in part to its growing operations here in Wyoming and with aspirations to operate coal-fired plants of its own. Mr. Boyce's company alone controls reserves with more energy potential than the oil and gas reserves of Exxon Mobil.

Mr. Boyce was chairman of an advisory panel for the Energy Department, organized by the National Coal Council, that produced a controversial report in March calling for exemptions to the Clean Air Act to encourage greater consumption of coal through 2025. The thrust of the report, which Mr. Boyce outlined in an interview, is that improvements in technology to limit carbon dioxide emissions should be left to the market instead of government regulation.

Mr. Morris, at American Electric Power, sees things differently. He cites cost concerns in arguing for its move to cleaner technology. At the request of environmental groups that hold shares in the company, A.E.P. agreed in 2004, shortly after Mr. Morris arrived, to report on the potential costs it would face if emissions rules were tightened. The company recognized that its growth beyond 2010 could be limited if it stuck with old technology.

The Bush administration has rejected mandatory limits on carbon dioxide emissions. Michele St. Martin, a spokeswoman for the White House Council on Environmental Quality, said, "such regulations would lead to higher energy prices, slower economic growth and fewer jobs for the U.S. as industries move overseas where greenhouse gas emissions are not similarly controlled."

Ahead of the 2008 presidential election, two senators often mentioned as candidates, Hillary Rodham Clinton, Democrat of New York, and John McCain, Republican of Arizona, have endorsed mandatory cuts in emissions. Mr. Morris of A.E.P. said such support has persuaded him that limits might be imposed in coming years.

Engineers have known how to make gas from coal for more than a century, using this method in the gaslights that first illuminated many American cities. A handful of coal gasification plants are already in operation in the United States, Spain and the Netherlands, built with generous government assistance.

As they proceed with plans to build pulverized coal plants, Peabody and other companies often point to their support of the alternative technology through their participation in Futuregen, a $1 billion project started three years ago by the Bush administration to build a showcase 275-megawatt power station that could sequester carbon dioxide and reduce other pollutants.

But Futuregen is already behind schedule, with planners now hoping to choose a site for the plant by the end of the year, with an eye on starting operation by 2012.

"Futuregen is a smokescreen, since it's not intended to bring technology to the market at the pace required to deal with the problem," said Daniel Lashoff, science director at the climate center at the Natural Resources Defense Council. "We don't have that kind of time."

APPENDIX UU


...AND WE'RE REGISTERED AT SHELL, MOBIL, BP AND TEXACO.
STAHLER.
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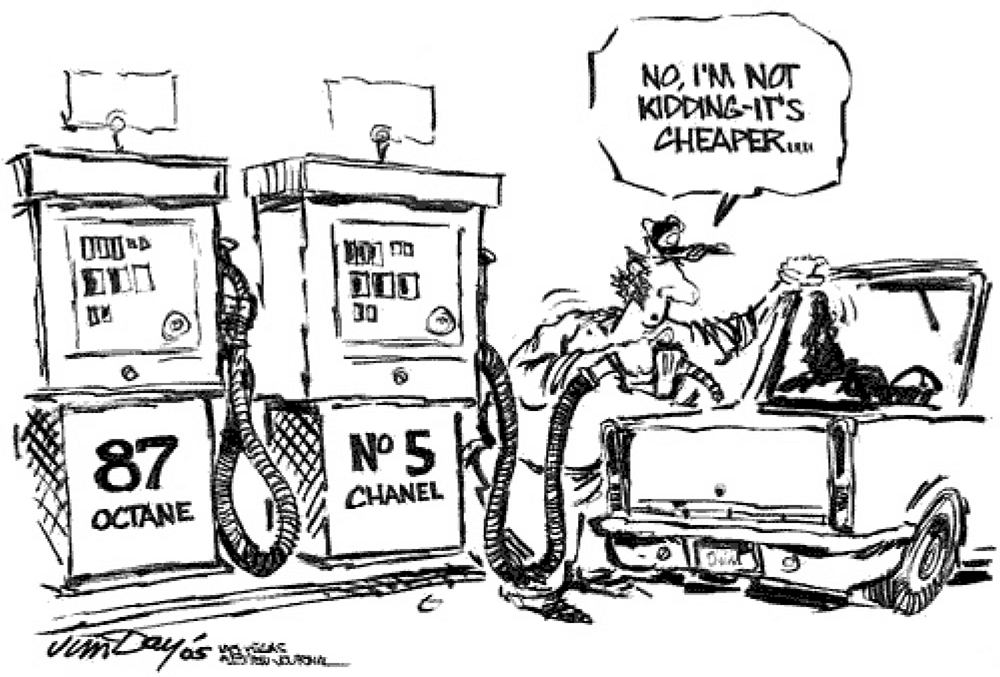
DEERING
ARKANSAS DEMOCRAT-GAZETTE
THE NEXT ITEM IN OUR CATALOG IS A CAN of PREMIUM UNLEADED...
GAS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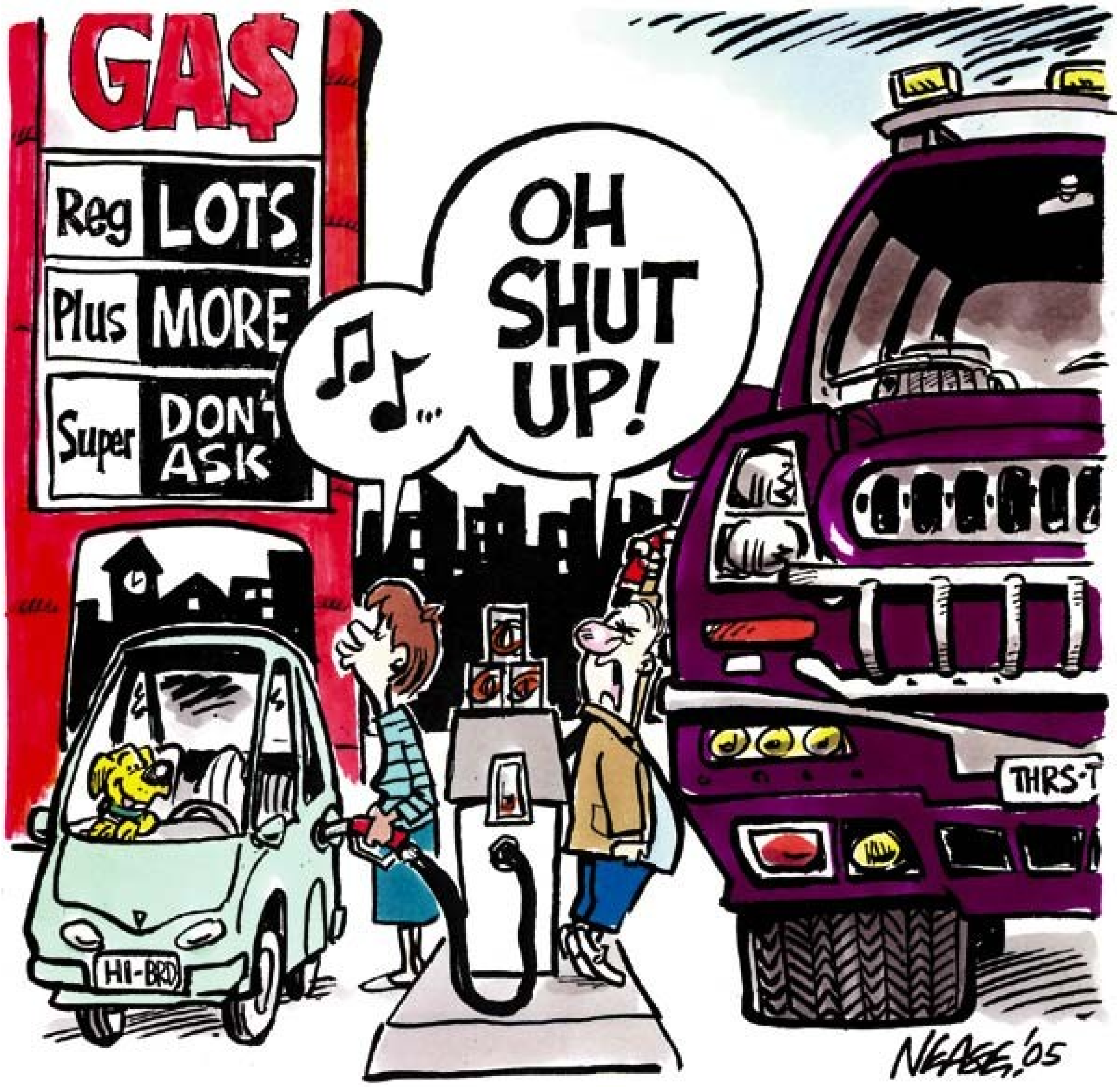
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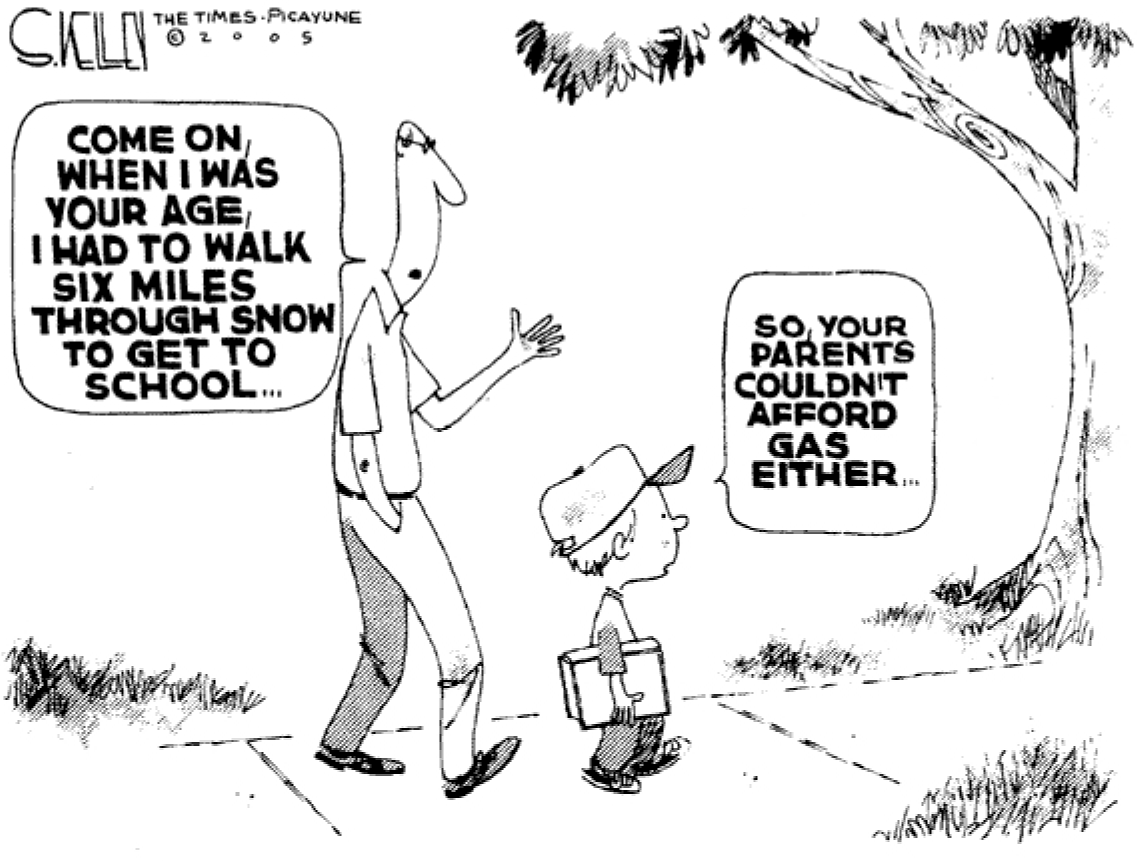
BACK IN 1952, GASOLINE COST 20 CENTS A GALLON.
WHEN YOU PULLED UP TO THE PUMPS, THREE GUYS CAME OUT AND CHECKED YOUR OIL AND YOUR TIRES AND CLEANED YOUR WINDOWS
THIS MUST BE THAT THING THEY CALL "SENILITY"


S.KELLEY THE TIMES-PICAYUNE © 2005
COME ON, WHEN I WAS YOUR AGE, I HAD TO WALK SIX MILES THROUGH SNOW TO GET TO SCHOOL...
SO, YOUR PARENTS COULDN'T AFFORD GAS EITHER...

APPENDIX VV

Bush gives hybrid vehicles big boost
The president asks Congress to lift cap on tax credits as a way to curb foreign oil use.
David Shepardson / Detroit News Washington Bureau April 26, 2006

"The easiest way to promote fuel efficiency is to encourage drivers to purchase highly efficient hybrid or clean diesel vehicles," Bush said in an address to the Renewable Fuels Association summit in Washington.

"If the automakers sell more than their limit, new purchasers are not eligible for the full tax credit."

"And so here's an idea that can get more of these vehicles on the road, and that is to have Congress make all hybrid and clean diesel vehicles sold this year eligible for federal tax credits," he said."

Consumers who buy hybrids currently receive up a tax credit worth up to $3,400, but Congress capped the number of tax credits at 60,000 vehicles per manufacturer each year.

If current law isn't changed, Toyota buyers may lose out on the tax break because Toyota sells more than 60,000 hybrids each year.

Ford Motor Co., by comparison, sold 17,000 hybrids in all of 2005. U.S. sales of hybrid-electric vehicle are expected to grow by 268 percent between 2005 and 2012, J.D. Power and Associates said in a report this year, jumping from 212,000 vehicles last year to 780,000 by 2012. At the forum touting E85 and ethanol, several members of Congress pitched plans to increase ethanol and reduce oil consumption.

U.S. Rep. Jack Kingston, R-Ga., called for eliminating Saturday U.S. mail delivery to save on gasoline costs.

APPENDIX WW

Friday, May 26, 2006
Fuel costs take a little wind out of boaters' sails
Some reduce trips, increase dock time
By David Goetz

Even with the price of gasoline pushing $3 a gallon -- about $1.50 a mile for a modest cruiser -- many recreational boaters will tell you they haven't cut back on their time on the water.

The standard line has been if you can afford the boat you can afford the gas. But there are signs that boaters are feeling some of the same price pressures as motorists.

In a study by the National Marine Manufacturers Association, a boating-industry trade group, more than half of the owners surveyed said they were likely to or had already begun to slow down, keep their boats out of the water longer or cut back on the distance they cruise because of fuel costs.

"What we're hearing is shorter trips, fewer trips," said Scott Croft, spokesman for the Boat Owners Association of the United States. "Our members are telling us they're upset for sure. They're telling us they're going to spend more time in the dock, they're going to spend more time closer to home, but they're not going to give up boating."

Energy analysts differ on the details, but their central message is clear: Don't expect any breaks at the pump in the next few months.

If the skies start to cloud up over the Gulf of Mexico in August and September, don't be surprised if the price tops $3 a gallon on speculation of possible hurricane damage.

Tom Kloza, Oil Price Information Service analyst, isn't that optimistic about the touchy spot markets.

"I think we'll see a price equilibrium of about $2.70 to $3 a gallon in most areas in the next 40 days," Kloza said. "After this respite, we'll see a lot of updrafts as the hurricane season moves into high gear."

A major storm threatening refineries from Texas to Mississippi could raise spot prices as much as 25 cents a gallon, "about five or 10 times what storms used to do," Kloza said. "An actual landfall in Hurricane Alley puts all sorts of numbers into the equation."

APPENDIX XX

Sunday, April 30, 2006 - Page updated at 12:00 a.m.

Will higher gasoline prices take us down another, but better road?

By T.M. Sell
Special to The Seattle Times

The headlines were the same for a week: "Oil hits new record high."

As gas prices rose, consumers regaled TV newscasts with the perils of the gas pump.

Meanwhile, you can expect another rush of books featuring pop analysis predicting a coming dark age unless we do something now.

Nonetheless, it ain't necessarily so, and that's too bad.

Prices are not at record highs, unless you ignore inflation. The actual record price for a barrel of oil was $97.50 in December 1979, measured in December 2005 dollars. Gasoline prices are close to record highs — self-seerve regular averaged $2.91 a gallon a week ago, according to the nationwide Lundberg Survey of 7,000 gas stations.

But gasoline averaged around $3.25 a gallon in 1918 and nearly $3 in 1980, again in 2005 dollars.

So there's good news and bad news on the energy front.

First the good news: For 200 years, until the mid-19th century, whale oil was the chief source of lighting for much of the country. And yet the demise of the whaling industry didn't plunge the nation into darkness.

We discovered oil, refined it into kerosene, and gave the whales a break.

What has a lot of people worried now is Hubbert's Peak. M.K. Hubbert was a Shell Oil geologist who, back in the 1950s, predicted that U.S. oil production would peak about 1970. Despite being derided by experts at the time, he was correct.

Using Hubbert's methods, others have now predicted when world oil production will peak. Estimates have ranged from 2004 to 2112, with the gloomiest group aiming for sometime this decade.

With China and India's economies blooming into fuel-burning, car-driving splendor, consumption of oil is rising. But the estimates all depend on how much recoverable oil is out there. Estimates range from 1.8 trillion to nearly 4 trillion barrels.

Nor do the estimates include oil from the tar sands of Alberta, Canada, or the oil shale of Colorado. As prices rise, reclaiming that oil becomes profitable.

Expensive oil eventually means more transportation choices.

Such a transition also will have benefits. Automobiles continue to be the single greatest source of air pollution and greenhouse gases.

Some people say either that there's no global warming, or that it's a naturally occurring phenomenon and that we shouldn't worry.

Science doesn't seem to be on their side, however, as the evidence mounts that the warming of the Earth coincides closely with the industrial revolution and expanding human population.

Global warming is expected to cost the world 1 to 3 percent of total world gross product, a measure of the entire global economy. Spread out evenly, the cost might be bearable.

But the cost won't be spread out evenly. If the polar ice caps keep melting, goodbye Florida, among other places.

APPENDIX YY

AUTO INDUSTRY GOES ON OFFENSE IN FUEL DEBATE: Under increasing pressure to reduce the nation's dependence on foreign oil, the auto industry is kicking off a multimillion-dollar advertising campaign Monday to convince Congress and the public it's doing its part -- and to lobby for better consumer access to alternative fuels. The Alliance of Automotive Manufacturers, a trade group that represents automakers including GM, Ford, DaimlerChrysler, Toyota, Mazda and BMW, is launching a campaign to recast the industry's image amid attacks from environmentalists and some oil companies that have chided automakers for failing to significantly improve fuel economy amid the recent run-up in gas prices. **Detroit News**

APPENDIX ZZ

Auto industry goes on offense in fuel debate
Ads debut Monday as Congress looks at raising fuel economy rules.
David Shepardson / Detroit News Washington Bureau May 6, 2006

Under increasing pressure to reduce the nation's dependence on foreign oil, the auto industry is kicking off a multimillion-dollar advertising campaign Monday to convince Congress and the public it's doing its part -- and to lobby for better consumer access to alternative fuels.

The campaign's Web site, discoveralternatives.com, is already operating. The ads will offer a detailed look at vehicles already on the road that aren't gas guzzlers. In one spot, green tread marks appear on an empty Georgetown street with the slogan: "There goes another one."

"We want to let people know what we're doing. We know we have a lot to do, but we've already done a lot," said Gloria Bergquist, a spokeswoman for the trade group.

The industry says there are more than 40 alternative fuel vehicles for sale that rely on gasoline-electric power, diesel or processed corn, and 35 more will be introduced in the next year. Some 8 million alternative fuel vehicles are in use on U.S. roads today, including about 5 million vehicles capable of running on E85 -- a fuel made of 85 percent ethanol, a corn derivative.

The growing debate over gas prices and fuel economy is expected to be front and center when Bush meets with the CEOs of Detroit's three automakers May 18 at the White House.

David Friedman, director of the Clean Vehicle Program at the Union of Concerned Scientists, dismissed the ad campaign.

"Instead of putting the engineers to work to improve fuel economy, they're using the marketers," he said. "They've got to stop looking in the rearview mirror and agree to dramatically improve fuel economy."

The campaign -- targeted at Congress and so-called opinion makers -- includes banner ads that will appear next week on Internet blogs heavily trafficked by congressional aides both on the left and right of the political spectrum -- dailykos.com, wonkette.com, redstate.com and corner.nationalreview.com.

The advertisements are designed to influence the intensifying debate in Washington over the role automakers should play in reducing oil consumption.

The campaign will also feature ads in the Washington Post, Roll Call, Congressional Quarterly and National Journal.

Many of the print ads offer a breakdown of alternative vehicles in use in each state. Texas has 748,000 alternative fuel vehicles, the most in the country due primarily to the large number of diesel vehicles. Michigan has 358,000 alternative fuel vehicles, the fourth highest in the nation, but just 5,236 hybrids, which is 15th highest.

Another ad reads: "The Liquid Diet We'd Like To See" and shows a fueling station with gas, diesel, ethanol and hydrogen. "As a country, we need to work together to ensure diverse energy supplies," the ad said.

Nearly all of the flexible fuel vehicles on the road today operate on regular gasoline, because out of 180,000 gas pumps nationwide, just 650 offer E85, including just six in Michigan.

APPENDIX AAA

Ford aims to lead in AWD model sales

5 more vehicles to have all-wheel-drive built in
May 21, 2006
BY SARAH A. WEBSTER

By 2007, Ford expects that it will sell half a million all-wheel-drive vehicles in the United States, or nearly a third of those sold today. The automaker will add the feature to five models this year, bringing the total number of cars and trucks with all-wheel-drive to 22.

"We could be a very dominant player very quickly," Brett Wheatley, a product marketing and strategy manager at Ford, told the Free Press in a recent interview. "We think this is going to give us a real competitive advantage."

The plan will bring all-wheel-drive to the company's Ford Fusion, Mercury Milan and Lincoln MKZ mid-sized sedans in August and to the new Ford Edge and Lincoln MKX crossovers this fall. Ford already offers it as an option in other vehicles, such as the Freestyle crossover and the Five Hundred full-sized sedan.

Wheatley said the automaker is so serious about its plan that it is even considering branding its all-wheel-drive system with a unique name, as Audi has done with its quattro and Mercedes-Benz has done with its 4MATIC.

As concerns over rising gas prices have grown, droves of drivers have been moving out of big SUVs and into cars and crossovers, which often look like SUVs but are more fuel-efficient and built on car underpinnings.

Ford and other experts who study the automotive market say that many of these customers have been asking for the four-wheel-drive or all-wheel-drive systems that often came in their SUVs, even though they are slightly less fuel-efficient.

To catch this post-SUV wave, Detroit-based General Motors Corp. and Auburn Hills-based Chrysler Group are also adding all-wheel-drive as an optional or standard feature in some cars and crossovers.

Steve Bartoli, Chrysler's vice president for product planning, said Friday that he expects 10%, or 200,000, of Chrysler's annual U.S. sales will be of vehicles with all-wheel-drive systems by 2012. Only 4% of Chrysler's sales last year were all-wheel-drive.

However, Bartoli also cautioned that there might be significant counterbalances to that growth, such as fuel efficiency concerns and population shifts to warmer climates, which could reduce demand for such systems.

Dave Roman, a spokesman for GM, would not divulge the automaker's all-wheel-drive targets, calling them proprietary. Still, he noted, "we absolutely see there's more interest."

Subaru's vice-president of marketing, Rick Crosson, said Thursday that he isn't threatened by Ford's new strategy.

He said that Subaru hasn't had much competition in the lower-price end of the all-wheel-drive market since 1996, when it decided to sell all-wheel-drive vehicles exclusively.

Ford, Crosson said, might even help Subaru educate the public on the value of all-wheel-drive systems.

Ford thinks it can be the all-wheel-drive leader by zeroing in on an opportunity in the middle of the market.

About 1.6 million, or 10%, of the 17 million vehicles sold in the United States last year had all-wheel-drive systems, according to data from R.L. Polk & Co.

Subaru made nearly 196,000 of those vehicles, all of which were cars and crossovers priced between $18,295 and $37,695. Most of the other all-wheel-drive cars and crossovers sold were expensive, luxury models made by Audi, BMW, Cadillac, Mercedes-Benz, and Ford's own Volvo.

But Ford believes the demand for all-wheel-drive is about to skyrocket for vehicles that sell for under $35,000.

APPENDIX BBB

http://www.90poundsuv.com/

Good morning, America!
Are you anywhere near a parking lot?

VERSE
Let me warn you right now
You're in for a war
There's someone a waitin'
To take your parkin' spot
She's hell on wheels
She's the new big deal
She's America's true sweetheart

Oh, she's a...

CHORUS
90 pound suburban housewife
Drivin' in her SUV
Talkin' on her cell phone
Oblivious to you and me
Kids in the back seat watchin' the
little T.V.
She's a 90 pound suburban housewife
driving in her SUV.

VERSE
There I was a-drivin' down U.S. High-
way One
In my little Corolla
Enjoyin' the noon day sun
Then all of a sudden
I heard her engine roar
With rhino bars scarin' little cars
Goin' to the grocery stores.

Oh, she's a...

CHORUS

VERSE
She may be your neighbor
She may be your wife
She may be your mother for the
rest of your life
But one thing's for certain, I think
you'll all agree
With tons of steel and 4 big wheels
She'll be drivin' like an S.O.B.

Oh, she's a...

Dust to Dust Energy Report -- Automotive

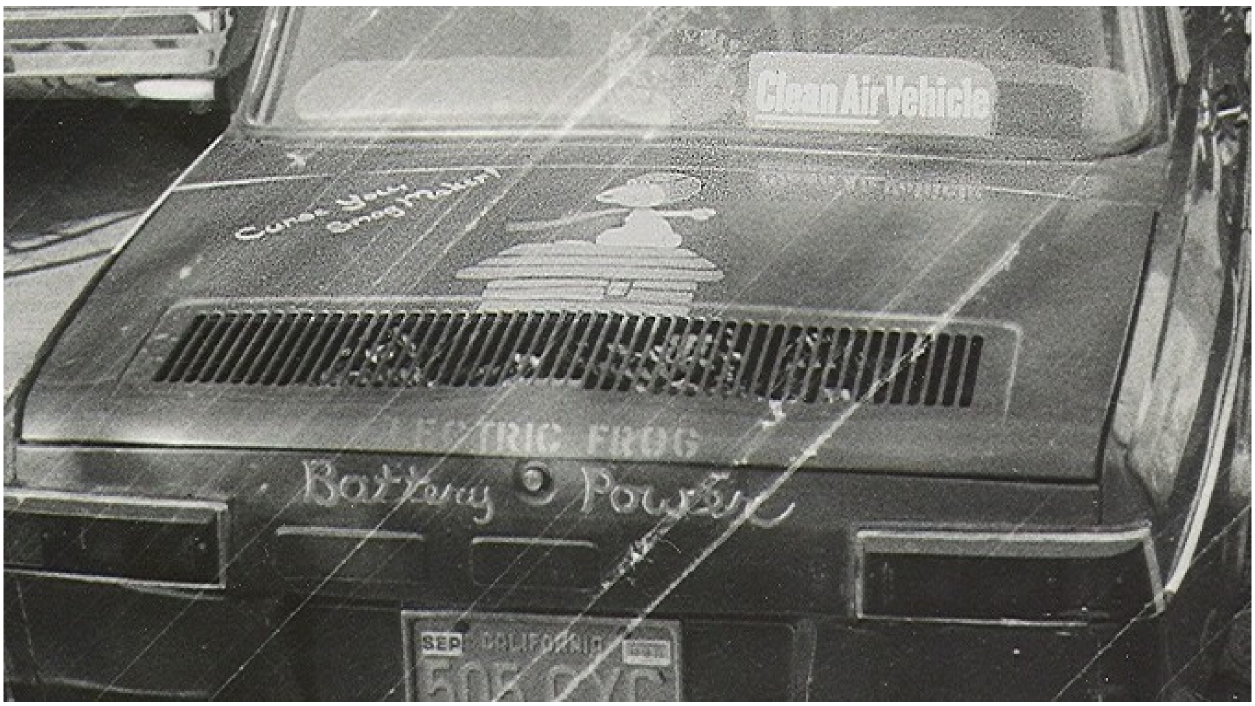
CHORUS

Words and Music by
Rozanne Gates and
Suzanne Sheridan

APPENDIX CCC

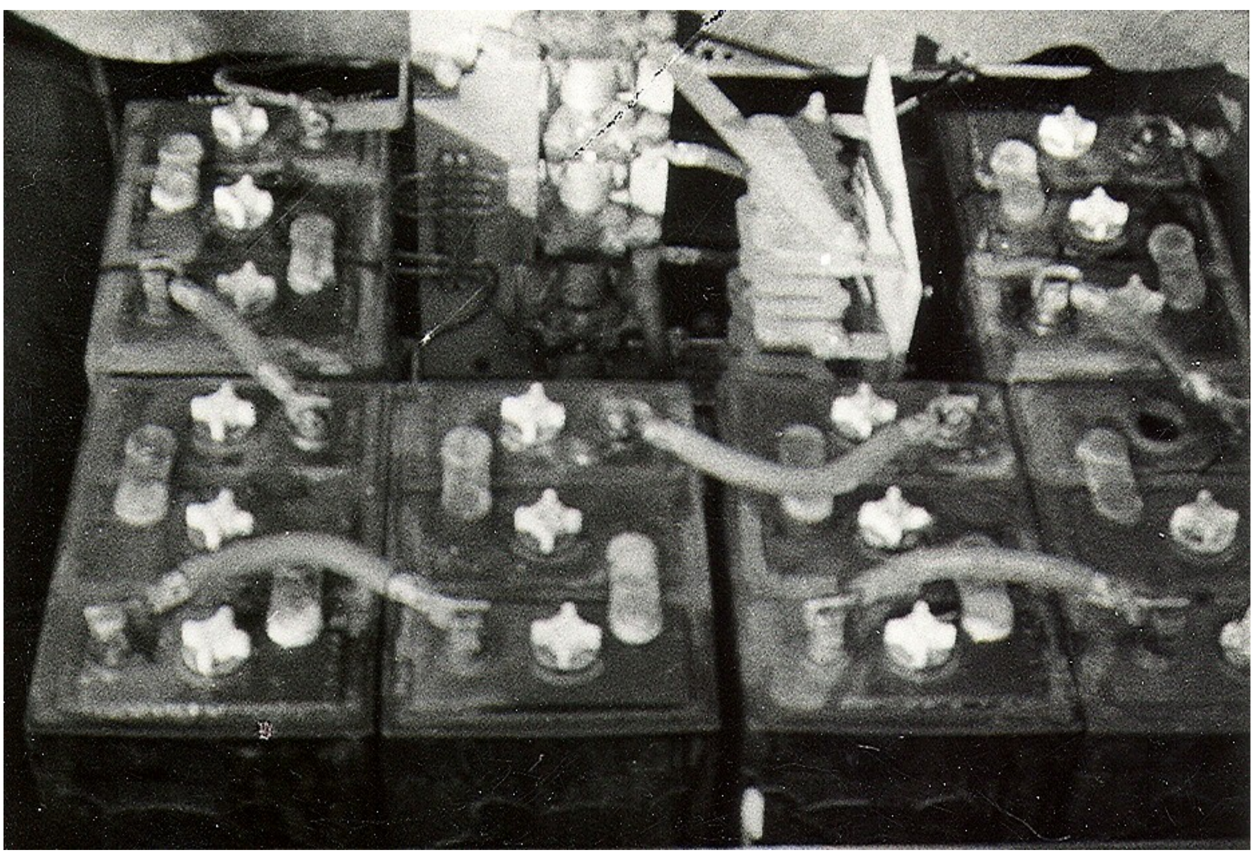
Following are a few pictures of Art Spinella's electric vehicle, driven to and from work (36 miles roundtrip; speeds up to 65 mph when LA freeways were faster than today) in Orange County area during the mid-late 1970s when he was the editor and publisher of "Electric Vehicle News and Views" newsletter.

A much thinner Spinella is shown in the last photo standing next to the electric "Elcar" which was offered for a few years in the U.S.



Vehicle: Renault R10 four door sedan (Maroon and white)
Top speed: 65 mph
Maximum distance: 58 miles
Controller: Mechanical
Batteries location: Rear engine compartment
Charging time: 10 hours for complete recharge
Re-charge: 110v; front-mounted plug-in
Motor: Aircraft, jet-engine starter; attached to transaxle
Transmission: Original four speed (overdrive fourth gear)
Built by: Eyeball Engineering, Fontana, CA


Clean Air Vehicle
ELECTRIC
505 CYC




CALIFORNIA
505 CYC


ELCAR

APPENDIX DDD

Wednesday, June 07, 2006
PERSONAL FINANCE :
Hybrid uses more energy, analyst says
By Bob Gary Jr. Staff Writer

Hybrid cars may burn less gasoline than their conventionally made counterparts, but at least one researcher said that's not all there is to comparing the two types of vehicles.

Art Spinella, president of Oregon-based CNW Marketing Research Inc., said he has come up with a way to determine how much energy a car consumes, beginning with the design phase and ending with its disposal. According to his "dust-to-dust" measure, gas/electric hybrids use more energy than some SUVs.

But Cindy Knight, a spokeswoman for Toyota Motor Sales, said Mr. Spinella's conclusions fly in the face of results from several "rigorous, peerreviewed" studies done at the Massachusetts Institute of Technology and elsewhere.

Chattanooga car dealer Tim Kelly, who sells Cadillacs, Saabs, Hummers and Subarus, said he's taking Mr. Spinella's research "with a grain of salt" until it undergoes peer reviews. Even so, he said, it serves a valuable purpose.

"If nothing else, it's a conversation starter," he said. "What he's attempted to do is qualify what a lot of us have known — the energy consumption problem isn't as simple as people want to make it."

Mr. Spinella, a University of Detroit journalism graduate, said he studied engineering at Michigan State University, is "trained as an engineer" and is a longtime technical writer. He said he did his own research for about two years.

He said the most energy efficient 2005 car sold in the United States, from initial concept to scrapping, was Toyota's Scion xB at 48 cents per mile. The least efficient was the Mercedes Benz-produced Maybach, at $11.58 per mile.

The most energy-efficient hybrid, according to the "dust-to-dust" standard, was the Honda Insight, at $2.94 per mile. By contrast, the Hummer H3 SUV checked in at $1.95 per mile. The industry average of all 2005 vehicles sold in the U.S. was $2.28 per mile.

Mr. Spinella said hybrids cost more in part because the production, replacement and disposal of batteries, electric motors and lighter weight materials is more expensive. The increased complexity of the power package also plays a role, he said.

"I’ve taken a lot of heat from hybrid owners, but that’s understandable," he said. "They ask how an SUV that uses twice as much gas possibly be more efficient. My response is that we’re not looking just at owner efficiency."

Mr. Spinella said SUVs need less energy than hybrids because the larger vehicles are made with simpler, less expensive materials and have a "tremendously long lifetime." The typical consumer pays about 10 percent of a vehicle’s total energy cost over that vehicle’s lifetime, he said.

But Ms. Knight, of Toyota, said hybrids use less energy in the "cradle to grave life cycle." She said studies at MIT and elsewhere have concluded that most of the energy used by a vehicle is in the driving stage, but Mr. Spinella gives far too much weight to what’s used in manufacture.

"Hybrids do consume a little more energy in the manufacturing process, but they overwhelmingly win that back in the driving stage by using less fuel and producing fewer emissions," she said.

Ms. Knight also said Mr. Spinella’s "extremely wrong, off the mark" when it comes to disposing of batteries.

"He argues batteries aren’t recycled, which is not true," she said. "We’ve had recycling programs in place since we made the (small SUV) Rav4 EV, a fully electric vehicle, in 1998. "There are services clamoring to sign up to recycle these batteries — metal to plastics to the steel case; they’re recyclable."

E-mail Bob Gary Jr. at bgary@timesfreepress.com

(CNW Note: See “coffee example” in the final chapter for just a few of the items missed in the Toyota response. Note, too, that Toyota has claimed a 30 percent reduction in the energy necessary to build vehicles but never provides the share of that savings that have been off-loaded to suppliers. The issue on battery recycling is one that relates to the nickel-based battery and the recycling effort in Japan is distinctly different from the one in the U.S. For further analysis, see the full report.)